

THE PRACTICE OF BIRTH CONTROL

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AN ANALYSIS OF THE BIRTH-CONTROL EXPERIENCES OF
NINE HUNDRED WOMEN

by

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FOREWORD

Books like this are a happy proof that the birth-control movement is passing rapidly from the stage of enthusiasm to the stage of science. It has reached a period in its development where there is already at its disposal a body of experience which permits us to formulate significant generalisations. No one can read Dr. Charles' valuable analysis without seeing how usefully she has cleared the ground for this purpose.

I do not think I misstate the real lesson of her book if I suggest that it is, above all, a demand for more research and wider investigation. So far, the social hostility which has surrounded birth control, the legal prohibitions which it has encountered, have prevented adequate provision being made for proper research into the methods of which it stands in need. No one now can doubt that birth control has come to stay. No one, either, who is not *a priori* hostile to its demands on religious or quasi-religious grounds, can doubt that, since it has come to stay, the fuller the knowledge at our disposal the more valuable will be its results both to society and to the individual. The reader of Dr. Charles' conclusions will, I am confident, feel that the more rapidly provision for birth-control technique is made a normal part of the funds devoted to biological research, the more effectively can we proceed to minimise the amount of unnecessary pain in the world.

The movement for the scientific control of population is only part of a wider movement for making mankind the master of its fate. It seems to me more fraught with potentialities for good than any other comparable discovery. Our problem is to treat it in the sober way that we treat any scientific issue which concerns the profoundest issues of public health. If Dr. Charles' book emphasises that lesson, it will not have been written in vain.

HAROLD J. LASKI

PART I

INTRODUCTION

The ethical aspect of contraception has been discussed in innumerable publications and on a variety of platforms. The question can be regarded as settled in so far as organised opinion, with the sole exception of the Roman Catholic Church, generally concedes that the use of contraceptive measures is admissible under certain circumstances. Indeed, it is not altogether necessary to exclude the Roman Catholic Church from this category, because that body permits the use of the so-called "safe period" as a means of limiting the family. Since it is intended to permit sexual intercourse to take place without the likelihood that conception will ensue, the safe period is just as much a contraceptive measure as the use of any artificial appliance. It should now be possible to discuss contraceptive methods without reference to moral issues. Applied science can legitimately enquire to what extent different types of motor-cars meet the requirements of comfortable and efficient transport without considering whether a particular car will in fact be used by a rural dean or a racketeer. Similarly, applied social biology can investigate different types of contraceptive method without concern for the ethics of their use in any particular case. The enquiry undertaken in this book is not concerned with ethical issues. The experiences of about nine hundred women have been studied in order to find out something about the contraceptive methods most commonly used. In the present work all conclusions will be deductions from the facts recorded. In so far as all the relevant facts are set out, the reader will be able to form his or her own judgment concerning the validity of the conclusions.

The standard of efficiency to which a contraceptive method should conform embraces a variety of requirements. The ideal method would invariably prevent conception whenever it was used. It would not adversely affect the possibility of a later conception. It would involve no diminution in the enjoyment of either partner during the sexual act, would not affect the health of either adversely, and would require the minimum of trouble and expense. Such an ideal is far to seek at the present time. There is no reason to suppose that research adequately directed and financed could not solve the problem in a short time.

No one method used at present can be regarded as the closest

approximation to the ideal for all persons. If reliability were the sole consideration, an elaborate combination of existing methods such as to make the chance of an unwanted pregnancy altogether negligible could be prescribed. Actually such a combination might be so troublesome and disagreeable that very few persons would use it for any length of time. The extent to which aesthetic considerations have to be sacrificed to reliability varies with different individuals. Clearly, where urgent medical contra-indications to pregnancy exist and sterilisation is not practicable, the most reliable method known must be chosen. A professional woman whose career is incompatible with motherhood, or one who can have children provided they do not arrive at inconvenient times, will also demand high reliability. On the other hand, the woman who begins to practise birth control at the commencement of her married life, and who wishes to have a family of a size appropriate to her income, or who merely wishes to ensure a reasonable interval between births, may be satisfied with less reliability, if other advantages can be obtained. Workers in birth-control clinics are sometimes unduly depressed by their failures, particularly when these involve a further addition to a family of nine or ten children. The number of such hard cases can be expected to diminish rapidly with the spread of contraceptive knowledge. Even a comparatively unreliable method, if used continuously, will suffice in most cases to keep the family down to moderate dimensions.

When requirements other than reliability are considered, individual differences relevant to the choice of a contraceptive method are even more pronounced. A method which can be used by one individual with complete satisfaction will prove intolerable to another. From the information collected in the following chapters it is hoped that the individual may be assisted to form a correct judgment concerning the type of contraceptive method most suitable to his or her own particular case.

One source of information examined in this book is provided by reports and questionnaires issued by birth-control clinics. The first birth-control clinic in this country was started in 1921. Since then many others have followed, and from the records kept a considerable amount of information has been accumulated. Clinic data are, however, limited in many ways. One type of method predominates, and frequently contact is lost with the clients, so that continuous after-histories are not obtained. To fill these and other lacunae the

Birth Control Investigation Committee endeavoured to collect the birth-control experiences of a random sample of the population by means of a questionnaire. The questionnaires which were actually returned were filled in very largely by middle-class women. Hence they are not strictly representative of the general population. Nevertheless, they supply a body of information of a kind not hitherto available in this country. They provide a picture of the contraceptive methods actually in use in this section of society. On the basis provided by these questionnaires and by clinic material the succeeding chapters will aim at comparing the different methods and forming estimates of their relative reliability and acceptability.

Nothing is more difficult than to extract from human beings statements with reference to their sexual life corresponding at all accurately with their behaviour. Without underrating difficulties, it may be said that the questionnaire method, while admittedly imperfect, has certain advantages. The assurance of anonymity and the absence of a possibly biassed reporter remove some sources of error. Necessarily the women who were able and willing to answer the questionnaire are selected to some extent for intelligence. Clinic workers are apt to find an explanation for many of the difficulties encountered in their work in the stupidity and fecklessness of some of their clients. Later chapters will show that a good many of these difficulties still remain for the more intelligent women. In addition to the questionnaires of the Birth Control Investigation Committee, a further set of questionnaires collected by a private clinic will be studied together with a set of visitor's reports upon women who visited the Birmingham Women's Welfare Centre. A strictly scientific study of birth control presupposes the possibility of co-ordinating the direct observations of independent investigators.

The information obtained in questionnaires is based on personal testimony. It is based upon personal testimony concerning matters of behaviour about which human beings rarely if ever tell the truth. An attempt has been made to circumvent this difficulty. In Chapters V and XIV a distinction has been drawn between those statements to which a reasonable amount of credibility can be attached and others which are open to a greater element of dubiety. Careful analysis of the former class of data can sometimes provide a check upon conclusions drawn from a consideration of the latter class. An attempt will be made to indicate lines upon which this can be done.

The material collected is limited in its scope in various ways. In

drawing up a questionnaire it is generally believed that enquiry into intimate details of sexual habit limits the number of replies which can be obtained. Accordingly no data have been obtained with reference to the frequency of sexual intercourse. Recent work on the physiology of reproduction, referred to in Chapter IX, leads to the belief that the frequency of sexual intercourse has an important bearing on the frequency of conception. The omission of information concerning this and other relevant factors will have to be borne in mind in estimating the validity of any conclusions drawn from the present study. All the experiences collected are those of women. In spite of this, the data show that two of the three most widely used contraceptive methods are practised by men. The fact that only women normally attend birth-control clinics has caused attention to be focused somewhat exclusively on feminine reactions to contraception. It is probable that in the majority of unions involving contraceptive measures at the present time, the male partner is the active agent. It may be hoped that a later study will be made of the contraceptive experiences of a number of men. The materials examined in the pages which follow lead to the conclusion that there are important differences in the results of contraceptive practice by the male as contrasted with those of methods used by the female partner.

The impulse to the present investigation has been the individual need for reliable information about contraception. In carrying out the analysis this practical objective has been kept in the foreground of the discussion. An attempt has been made to answer the questions which the individual asks about birth-control methods. In a field of investigation which is at the same time very new and of great immediate human interest it is essential to remember that real progress can be only made by adherence to the same principles of scientific enquiry as those employed in all other advances in knowledge. This necessitates the use of some applications of elementary statistical theory. The reader who is unfamiliar with statistical methods need not on that account be discouraged from perusing what follows. Statistical methods when used have not been introduced to elicit differences which are not apparent in the crude figures themselves. They are only employed to indicate the amount of reliability which can be attached to the differences which are recorded.¹ The reader

¹ Throughout this book the statistical constant preceded by the plus-and-minus sign is the standard deviation (i.e. the square root of the mean square deviation) of the figure to which it refers.

wearied by too many figures may turn to Chapter VII for information of a more personal nature which cannot be summarised in tabular form. The results of the enquiry as they bear on the practical issue for the individual in search of reliable information about birth control and upon the social implications of contraceptive practice are summarised in the concluding chapter.

Such conclusions are of a tentative nature. Lest it should not be sufficiently evident in what transpires subsequently, it may be as well to emphasise at the outset that they are proffered without dogmatism. Later and more extensive enquiry may make it necessary to revise them in many respects. The total number of individuals whose birth-control experiences are dealt with is somewhat less than one thousand—to be precise, eight hundred and seventy-four. A much larger sample would be necessary to justify a high measure of confidence concerning some of the less frequent methods employed or the contraceptive practice of different types of individuals. For two methods of contraception, the male sheath and the Dutch cap, the data are sufficiently numerous to be instructive. Attention has therefore been directed more especially to the use of these two methods. With the fullest recognition of the need for more extensive enquiries on the lines suggested by the evidence examined, it may be pointed out that in this field, as in other departments of sociology and applied social biology, the limitations which beset the work of any single investigator are not such as to render valueless a study based upon a comparatively small number of cases. In the long run progress must depend upon pooling the results of many investigations.

Several reasons have encouraged the writer in undertaking the publication of this enquiry. One is that a large proportion of the case histories examined, unlike many which have been made the basis of previous discussions of contraceptive practice, cover a period of many years. Another is that the case histories examined, though defective in several respects, of which one has been mentioned, are more circumstantial than those which have been made the basis of previous discussions of contraceptive practice. The examination of these data has thus brought into clearer perspective some of the deficiencies in the information on which previous enquiries have relied—the lack of uniformity in the criteria which have been employed to assess the comparative reliability of different contraceptive methods, and the possibility of applying more searching

analysis to birth-control statistics by relying as little as possible on statements of a kind which could not be made amenable to independent verification. If the number of cases examined does not prove to be sufficient to outweigh more ample data which may subsequently modify the inferences which will be made, it may still be hoped that the treatment of the material will suggest methods which may eventually aid in reducing to order the present chaos of conflicting testimony concerning the reliability of contraceptive practice.

PART II

QUESTIONNAIRES COLLECTED BY
THE BIRTH CONTROL INVESTIGATION COMMITTEE

CHAPTER I

NATURE OF THE MATERIALS

The material to be described in this part consists of replies to questionnaires which have been issued by the Birth Control Investigation Committee. They were obtained from various sources, such as women's organisations. A circular was first issued requesting those who were willing to furnish information with regard to their experience of birth control to apply for the questionnaire. The following page is an exact copy of the questionnaire.

In all 487 completed forms were received. Of these 39 had to be

TABLE I

| Date when Contraception Commenced | Method Used | Husband's Occupation | Successful or Unsuccessful |
|-----------------------------------|----------------------------------|-------------------------|----------------------------|
| 1880 | Sheath | Compositor | Unsuccessful |
| 1884 | Syringing with alum | Brewer | Unsuccessful |
| 1887 | Coitus interruptus, later sheath | Schoolmaster | Successful |
| 1887 | Coitus interruptus, later sheath | Civil Servant | Unsuccessful |
| 1888 | Coitus interruptus and sheath | Coal Merchant | Unsuccessful |
| 1888 | Coitus interruptus | Clerk | Successful |
| 1889 | Sheath | Inspector of Schools | Successful |
| 1889 | Coitus interruptus, later sheath | Congregational Minister | Unsuccessful |
| 1889 | Rubber cap | Chemist | Unsuccessful |

rejected either because the information was too meagre to be of any use or because conflicting statements were made; 16 forms had been filled by the husbands, and these were also rejected; 432 questionnaires remained to be analysed. The writers of 12 of these had employed no contraceptive methods whatever. The mean duration of active reproductive life covered by the questionnaires was 12 years \pm 0.27, with a coefficient of variation of 44.8 per cent. The mean age at marriage was 24 years \pm 0.18, with a coefficient

Confidential.

BIRTH CONTROL INVESTIGATION COMMITTEE

1. Date of marriage..... Present age.
2. Husband's occupation
(Please describe as exactly as possible.)
3. Details of Pregnancies. (A miscarriage counts as a pregnancy; twins count as one pregnancy.)
 Born alive..... Stillborn..... Miscarriages.....
 Total of pregnancies..... Alive now.....
4. Have you ever used Birth-Control methods?.....
5. How soon after marriage did you adopt Birth-Control methods? What methods did you adopt?
 [Coitus interruptus (withdrawing or "being careful"), "safe period", soluble pessary (what kind? quinine or other), rubber cap (what kind? state if fitted by a doctor or midwife), sponge, prolonged nursing, sheath ("French Letter"), douching, or any other method.]
 Please describe exactly the method used. If you have used two methods at the same time, please say so.
6. For how long was the method or methods used without interruption?
7. What methods have you used subsequently?.
8. At what periods of your married life have you used each subsequent method? And for how long?
9. Have any methods failed while you were using them? If so, can you account for the failure in any way?.....
10. What methods have you found the best, and why?.....
11. Have you abandoned any method because you do not like it? If so, state why.
12. (a) Have you given up Birth Control in order to have children?.....
 (b) If so, how often?.....
 (c) What methods have been given up for this purpose?.....
 (d) How soon after have you become pregnant after they were given up?
13. Any general remarks, including if possible your opinion of the effects of the use of Birth Control on the health and mutual happiness of husband and wife.

of variation of 15·6 per cent. The dates of marriage range from 1880 to 1929, so that the questionnaires cover a period of 50 years. There were a few replies of very early date. These consist of nine cases in which contraception had been used before 1890. The earliest instance is that of the use of the sheath starting in 1880. One example of the early use of a rubber cap is not definitely dated. The marriage took place in 1887, and the use of the cap appears to have commenced about 1889. With this exception, all these earlier cases are definitely dated. In one case history beginning in 1885 no contraceptive method was employed. Certain facts concerning these examples of the early use of contraceptive methods are presented in Table I.

TABLE II

| Group | Contraceptive Methods Used | | No Contraceptive Method Used | | Total | |
|-------|----------------------------|-------------|------------------------------|-------------|--------|-------------|
| | Number | Percentages | Number | Percentages | Number | Percentages |
| I | 307 | 73·1 | 2 | 16·7 | 309 | 71·5 |
| II | 50 | 11·9 | 1 | 8·3 | 51 | 11·8 |
| III | 26 | 6·1 | 2 | 16·7 | 28 | 6·5 |
| IV | 23 | 5·5 | 0 | 0·0 | 23 | 5·3 |
| V | 7 | 1·7 | 4 | 33·3 | 11 | 2·5 |
| VI | 0 | 0·0 | 0 | 0·0 | 0 | 0·0 |
| VII | 7 | 1·7 | 2 | 16·7 | 9 | 2·1 |
| VIII | 0 | 0·0 | 1 | 8·3 | 1 | 0·2 |
| | 420 | | 12 | | 432 | |

The writers of the questionnaires have been classified socially and economically according to their husbands' occupations. The classification is that employed in the compilation of the Census. Occupations are arranged in eight groups. Group I includes professional men, clerks, civil servants, army and navy officers, clergymen, commercial travellers, and those possessing private means. Group II is composed of shopkeepers, dealers, and farmers. Groups III and IV are skilled and semi-skilled workers. Groups V, VI, VII, and VIII are made up of unskilled labourers, textile workers, miners, and agricultural workers respectively. All recognised occupations are placed in one or other of these groups in the Registrar-General's Report on the 1911 Census. Groups I to V are arranged in descending

order of social prestige and economic status. Groups VI to VIII are classified separately in the Census reports because the birth-rate in these classes presents special features, being low in Group VI and high in Group VII and VIII. Table II gives the numbers of questionnaires classified under the foregoing groups. As Group I is the most important group numerically, further details of the occupations in this group are given in Table III.

Group I accounts for nearly three-quarters of the writers of the questionnaires. Groups I and II together may be regarded as belong-

TABLE III
OCCUPATIONS IN GROUP I

| | | | |
|---|----|----|-----|
| University Teaching and Scientific Research | .. | .. | 48 |
| Medicine and Dentistry | .. | .. | 35 |
| Business (mainly managerial posts) | .. | .. | 34 |
| Civil Service | .. | .. | 27 |
| Law | .. | .. | 26 |
| Education | .. | .. | 25 |
| Clerical | .. | .. | 18 |
| Engineering | .. | .. | 14 |
| Journalism, Publishing, and Literary Work | .. | .. | 14 |
| Ministers of Religion | .. | .. | 11 |
| Army and Navy | .. | .. | 11 |
| Secretarial | .. | .. | 7 |
| Commercial Travelling | .. | .. | 6 |
| Banking | .. | .. | 5 |
| Independent Means | .. | .. | 5 |
| Insurance | .. | .. | 4 |
| Accountancy | .. | .. | 3 |
| Art | .. | .. | 3 |
| Miscellaneous | .. | .. | 11 |
| Total | .. | .. | 307 |

ing to the so-called "middle class". These two classes include over 83 per cent. of the replies. There are fifty-one replies from the skilled and semi-skilled workers. The numbers in the remaining classes are very small. It will be seen that the material for analysis is very restricted both socially and economically. The proportion of university teachers and other professional men among the husbands is considerably higher than that found in the community at large. The women who replied to the questionnaire are probably

more intelligent than the average of their social group. They may possibly be more than usually interested in the subject of birth control. As far as could be deduced from internal evidence, the number who are active propagandists of birth control is negligible. These facts must always be borne in mind in comparing the results of the investigation with those of other workers.

The ensuing analysis may chiefly be said to represent the birth-control experience of women of at least average intelligence in comfortable economic circumstances. The majority of the questionnaires describe a number of different methods used successively. Regarding each method used by a given individual as a separate experience, the total number of separate experiences is 966. The majority of replies were very clear and full. In some cases the required information had to be deduced from various statements scattered throughout the questionnaire, but there were no serious ambiguities.

The foregoing description of the material to be analysed may be briefly summarised as follows: From the questionnaires collected by the Birth Control Investigation Committee, 432 were found to be suitable for analysis. Over 83 per cent. of the writers were placed according to their husbands' occupations in the Census Groups I and II, and may therefore be roughly described as "belonging to the middle-class". The average period of active reproductive life covered by the questionnaires is twelve years. Most of them deal with a variety of contraceptive methods, the total number of separate experiences being 966.

CHAPTER II

DESCRIPTION OF THE CONTRACEPTIVE METHODS EMPLOYED, TOGETHER WITH THEIR FREQUENCY

The contraceptive methods employed by the writers of the questionnaires are listed in Table IV. This gives the number of individuals who have used them. It will be seen that the majority of the questionnaires mention several methods, and that most of the best-known methods occur. For detailed descriptions of the various appliances reference may be made to *Contraception*, by Dr. Marie Stopes. A few comments on the various methods will serve for purposes of reference.

1. "*Sheath*" refers to the male penile sheath, also called "condom" or "French letter". It can be made of various substances. The only ones mentioned are rubber and skin.

2. "*Coitus interruptus*" is the practice of carrying out the process of copulation up to the moment immediately before ejaculation, when the penis is withdrawn, so that ejaculation takes place outside the vagina. It is also called "withdrawing" or "being careful". It is possible that the latter term may cover a procedure on the part of the female which consists in controlling the vaginal and uterine responses so that no female orgasm takes place. The absence of orgasm is popularly supposed to reduce the possibility of conception. In one or two instances the term "being careful" may have referred to this practice. No instance of it could certainly be identified in the questionnaires, and usually "*coitus interruptus*" was explicitly indicated.

3. "*Rubber cap or pessary*." This term covers a variety of appliances designed in some way to occlude the uterine end of the vagina so as to prevent spermatozoa reaching the uterus. Similar appliances also in use are made of metal, but no reference to these occurs. The rubber caps mentioned are classified in four groups.

Group 1 consists of cervical caps made entirely of rubber, with a high dome intended to fit over the fornices of the cervix, being convex towards the opening of the vagina when in position. This group includes the type of cap recommended by Dr. Marie Stopes, and is described under various names, such as "Stopes", "Prorace", "Occlusive", etc. Small variations in shape, etc., occur, but all caps

of this type agree in fitting over the os cervix. With all rubber caps, other devices are frequently used at the same time, as (a) some contraceptive substance in the form of jelly or ointment smeared round the rim of the cap, (b) a soluble contraceptive pessary inserted in the vagina after the cap is in place, (c) syringing on removal of the cap. In addition, with the cervical cap, a soluble pessary may be placed inside the dome of the cap, i.e. between it and the uterus.

Group 2 consists of the Dutch cap or diaphragm cap. It is larger than the cervical cap, and is nearly hemispherical in shape with a metal spring rim. It lies aslant the vaginal canal, and may be used either with the convex or the concave surface outwards. In this country it is usually placed so as to be concave outwards, in the opposite direction to the cervical cap. The Dutch cap is also referred to as the "large Mensinga" or "Haire".

Group 3, of which only three cases occur, consists of the Dumas or "Anti-geniture" cap. This is a small lens-shaped rubber cap, designed to occlude the uterine end of the vagina.

Group 4 consists of rubber caps of which no description is given, so that they cannot be identified with any of the above types.

4. *Quinine* is used as a contraceptive in many forms, the most common being the soluble pessary for insertion into the vagina before copulation, in which quinine is suspended in cocoa butter or gelatine. It is made in single or double strength, containing 0.324 gm. or 0.648 gm. of quinine bisulphate. Unless otherwise stated, "quinine" refers to the soluble pessary. Quinine is also used in the form of ointment or as a powder for use with a powder insufflator. It may be dissolved in water or olive oil for use as a douche.

5. Some of the other *chemical contraceptives* mentioned require more detailed description. "*Vimule*" is a soluble pessary containing quinine in cocola. "*Semori*" is a foaming tablet containing dioxyquinolin sulphate, potassium borotartrate, and foam-producing substances. "*Speton*" is a foam-producing tablet in which the principal spermicidal agent is sodium dichlorylsulphamidbenzoate. "*Chinosol*" contains potassium oxyquinolin sulphate in cocoa butter. "*Contraceptiline*" is a jelly containing lactic acid, glycerine and starch. "*Patentex*" is a jelly of German manufacture and unknown composition.¹

¹ Some of the foregoing details were obtained from a paper by J. R. Baker, "The Spermicidal Powers of Chemical Contraceptives" (*Journal of Hygiene*, Vol. xxxi, No. 3, 1931), and others from information supplied by Dr. Blacker.

TABLE IV

| | |
|--|-----|
| <i>Total number of questionnaires</i> | 432 |
| LIST OF METHODS WITH OCCURRENCE | |
| Sheath alone | 222 |
| Sheath + quinine pessary | 32 |
| Sheath + syringing with quinine | 1 |
| syringing with soap or vinegar | 1 |
| syringing with boracic acid | 1 |
| syringing with unknown | 12 |
| | — |
| | 15 |
| Sheath + quinine + syringing | 2 |
| Sheath + lactic acid pessary | 1 |
| Sheath + C.I. | 3 |
| Sheath + rubber cap | 3 |
| Sheath + H ₂ O ₂ pessary | 1 |
| | — |
| <i>Total Sheath</i> | 279 |
| Coitus interruptus alone | 197 |
| C.I. + syringing with water | 1 |
| syringing with quinine | 2 |
| syringing with quinine or Jeyes' fluid | 1 |
| syringing with unknown liquid | 4 |
| | — |
| | 8 |
| C.I. + quinine pessary | 3 |
| C.I. + quinine + syringing | 1 |
| C.I. + rubber cap | 2 |
| C.I. + micturition | 1 |
| <i>Total C.I.</i> | |
| <i>Rubber Cap—</i> | |
| Cervical | 81 |
| Dutch | 55 |
| Dumas | 3 |
| Unidentified | 65 |
| | — |
| <i>Total Rubber Cap</i> | 204 |
| <i>Quinine soluble pessary</i> | 120 |
| Quinine + syringing with iodine | 1 |
| syringing with water or unknown | 23 |
| | — |
| | 24 |
| Quinine + sponge | 1 |
| Quinine insufflation | 1 |
| | — |
| <i>Total Quinine</i> | 146 |
| <i>Carried forward</i> | 841 |

TABLE IV—*continued*

LIST OF METHODS WITH OCCURRENCE

| | | | | | |
|---|-----------------|----|----|----|------|
| Brought forward | .. | .. | .. | .. | 841 |
| <i>Memori</i> | .. | .. | .. | .. | 4 |
| <i>Spton</i> | .. | .. | .. | .. | 3 |
| <i>Other Chemical Methods—</i> | | | | | |
| Soluble pessaries | Chinosol | .. | .. | .. | 1 |
| | Vimule | .. | .. | .. | 2 |
| | Lactic acid | .. | .. | .. | 2 |
| | Oxygen | .. | .. | .. | 1 |
| Jellies | Contraceptaline | .. | .. | .. | 1 |
| | Patentex | .. | .. | .. | 1 |
| | | | | | — 8 |
| <i>Syringing</i> with quinine | .. | .. | .. | .. | 3 |
| with potassium permanganate | .. | .. | .. | .. | 3 |
| with lysol | .. | .. | .. | .. | 1 |
| with mercuric chloride, HgCl_2 | .. | .. | .. | .. | 1 |
| with mercury biniodide, HgI_2 | .. | .. | .. | .. | 1 |
| with alum | .. | .. | .. | .. | 1 |
| with salt | .. | .. | .. | .. | 1 |
| with water or unknown liquid | .. | .. | .. | .. | 27 |
| | | | | | — 38 |
| Safe period alone.. | .. | .. | .. | .. | 21 |
| Safe period with contraceptive outside period— | | | | | |
| With C.I. | .. | .. | .. | .. | 3 |
| With quinine | .. | .. | .. | .. | 1 |
| With syringe | .. | .. | .. | .. | 1 |
| | | | | | — 5 |
| Safe period with quinine, no intercourse outside period | .. | .. | .. | .. | 3 |
| Safe period with contraceptive (a) in period | } | | | | 3 |
| (b) outside period | | | | | |
| <i>Total safe period</i> | .. | .. | .. | .. | — 32 |
| <i>Sponge</i> | .. | .. | .. | .. | 11 |
| <i>Lactation</i> | .. | .. | .. | .. | 6 |
| <i>Gräfenberg ring</i> | .. | .. | .. | .. | 1 |
| <i>Vasectomy</i> | .. | .. | .. | .. | 2 |
| <i>Micturition</i> | .. | .. | .. | .. | 1 |
| <i>Sexual variations</i> | .. | .. | .. | .. | 3 |
| <i>Abstinence</i> | .. | .. | .. | .. | 16 |
| TOTAL | | | | | 966 |
| No method | .. | .. | .. | .. | 12 |

6. "*Syringing*" needs no description. The different substances used will be discussed below.

7. "*Safe period*" refers to the practice of confining sexual intercourse to that portion of the menstrual cycle in which it is supposed that conception cannot take place. The justification for this belief will be discussed later. The "safe" period is often referred to as "the intermenstrual period" or "middle week." In some cases individuals relied solely on restricting intercourse to a so-called "safe period". In others this practice was reinforced in a variety of ways, e.g.:

- (a) intercourse without contraceptives in the "safe period" and some other form of contraceptive outside it;
- (b) a contraceptive method (in the present cases, quinine) used in the "safe period", no sexual intercourse outside it;
- (c) one form of contraceptive used in the "safe period", and another, presumed to be more reliable, outside it.

8. The "*Sponge*" is usually made of rubber and is used to occlude the end of the vaginal canal. It may be dipped in various substances such as oil or vinegar before insertion.

9. "*Lactation*" is frequently prolonged beyond the customary period with the hope of avoiding conception. No cases of this occur. Those tabulated are cases in which the subject relied on lactation for the normal period as a means of avoiding pregnancy at that time.

10. "*The Gräfenberg Ring*" is a silver ring inserted inside the uterus and left there, having no connection with the vagina. As only one case of this occurs, further discussion is unnecessary.

11. "*Vasectomy*" refers to the operation of rendering the male sterile by section of the duct (*Vas deferens*) of the testis. This operation does not, like castration, involve diminution of sexual activity, sexual excitability, or size of the external genitalia and development of the male secondary characteristics.

12. "*Micturition*" refers to the procedure of passing urine immediately after intercourse in the belief that conception can be prevented by this means.

13. The term "*Sexual variations*" is used to cover three cases in which the form of intimacy adopted was not normal copulation nor coitus interruptus. One of them, *Karezza*, is the method stated to be the practice of the Oneida community in America. It consists of control of the part played by the male, so that after a period of

contact between the erect male penis and the vagina the erection subsides without ejaculation taking place.

14. "*Abstinence*" should not be regarded as a contraceptive method as the latter term is defined by Stopes, since it does not permit of any satisfaction of the sexual impulse. It was included in the table in order to differentiate between those cases practising abstinence and those in which apparently no attempt whatever was made to limit the size of the family.

In the group of individuals who used no contraceptive method is included one individual who resorted to the use of quinine pessaries at the age of forty-eight. Where a + sign occurs between two or more methods, it indicates that such methods were used simultaneously.

CHAPTER III

THE RELIABILITY OF THE DIFFERENT METHODS

The first question to be discussed in detail will be how far the methods used were successful in preventing undesired pregnancies. In the present section attention will be confined to this alone. The data derived from the questionnaires are set out in Table V. In certain cases a method failed more than once when used by the same individual, so that more than one unwanted pregnancy occurred. These successive failures are shown in Table VI. No successive failures occurred with the methods not shown in Table VI.

Before discussing the results obtained, the form of Table V and the reservations necessary for interpreting it will be considered. Column (1) calls for little comment. It will be seen that the cases in which the sheath was used with another method are first given separately and then collected under the heading "Sheath and another method". The same applies to coitus interruptus and quinine.

Column (2) gives the number of cases in which unwanted pregnancies occurred while using the method. The total number of unwanted pregnancies is somewhat larger, as in a few cases two or more unwanted pregnancies occurred while the same women were using a single method. No doubt arose in determining the figures in this column with the exception of one case which is marked with an asterisk. In this case a period was delayed seven days, and then supposed to have been brought on by the use of Epsom salts and turpentine. Whether a failure occurred in this case or not is not clear. The criterion of whether a pregnancy was "unwanted" was, for the purposes of this table, the statement made by the writer of the questionnaires. Such statements were in all cases unambiguous. From a strictly behaviourist standpoint all statements made by human beings about themselves must be regarded as unproven in the absence of corroborating evidence. In many cases no doubt can exist concerning the genuineness of the desire to avoid conception. But in a few cases where the woman concerned was evidently intelligent and comfortably situated it is sometimes possible to doubt whether her actions afford very convincing evidence concerning the intensity of her desire not to become pregnant. The issue is a complicated one, and there exist no means for dealing with it

decisively. It is very clearly expressed by one woman in her reply to the questionnaire:

"Part of the erotic component in her case (the woman's) is desire for a child, and to ask her to take steps to prevent this is to antagonise her deepest feelings. She is excited by the idea of being given a child, even though in crude fact she does not wish to become pregnant. Measures taken by the man (e.g. sheath) militate less against this illusion than do measures taken by the woman herself. Seeming failure of contraceptive methods may be due at times to the unconscious desire in the woman being stronger than the conscious, and so causing carelessness. This conflict may explain why abortion continues widespread even now when contraceptive knowledge is available."

The point is certainly worth bearing in mind, particularly when discussing the reliability of methods used by the woman. It may possibly throw some light on the very different results reported from different sources for such methods. This issue will be mentioned again in considering the efficacy of double methods. For the present it may be left with the suggestion that the most reliable method may possibly appear to fail in a few cases because there exists in the mind of the person using it conflicting attitudes towards pregnancy.

In column (3) are listed the cases in which a method has been successful for a period of less than one year. In estimating the percentage of successes this column has been left out of account altogether on the grounds that a period of under a year affords no evidence that conception has been prevented. It would probably be generally admitted that in the human species under existing conditions conceptions do not usually follow each other uninterruptedly even when no check whatever is used. For a small group of individuals who used no contraceptive method the rate of conception was about once every three years. This is of importance in comparing the results obtained in the investigation with those obtained by other investigators. In some publications on birth control successes have been claimed for a method which has only been in use for a few months. In any given case no means exist for deciding whether conception has been prevented or not. The probability that this has happened is mainly a function of previous and subsequent pregnancies and of the length of time involved. It would be a great service to future investigators if some international convention could be adopted to define a criterion for success or failure.

TABLE V

RELIABILITY OF CONTRACEPTIVE METHODS

| Method | Failed | Successful, less than One Year | Successful, over One Year | Mean Duration of Successful Period, in Years | Percentage of Success |
|--|--------|--------------------------------------|---------------------------------|---|-----------------------------|
| (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Sheath alone</i> | 23 | 93 | 106 | 5 ± 0.4 | 82 ± 3.4 |
| Sheath + quining .. | 0 | 9 | 23 | 4 ± 0.6 | 100 |
| Sheath + syringing .. | 1* | 3 | 11 | 8 | 92 ± 7.8 |
| Sheath + quinine .. | 0 | 0 | 2 | 3 | — |
| + syringing | | | | | |
| Sheath + lactic acid sol. | 0 | 1 | 0 | — | — |
| Sheath + H_2O_2 sol. .. | 0 | 0 | 1 | 2 | — |
| Sheath + C.I. | 0 | 0 | 3 | 2 | — |
| Sheath + cap | 0 | 2 | 1 | 3 | — |
| <i>Total Sheath + another method</i> | 1 | 15 | 41 | 4.7 ± 0.5 | 98 ± 2.2 |
| <i>Coitus interruptus alone</i> | 39 | 81 | 77 | 8.2 ± 0.7 | 66 ± 4.4 |
| C.I. + syringing .. | 2 | 2 | 4 | 14 | — |
| C.I. + quinine .. | 0 | 2 | 1 | 2 | — |
| C.I. + quinine | 0 | 0 | 1 | 10 | — |
| + syringing | | | | | |
| C.I. + rubber cap .. | 0 | 1 | 1 | $1\frac{1}{2}$ | — |
| C.I. + micturition .. | 0 | 0 | 1 | $3\frac{1}{2}$ | — |
| <i>Total C.I. + another method</i> | 2 | 5 | 8 | 8 | — |
| <i>Rubber Cap</i> | | | | | |
| Cervical cap | 17 | 20 | 44 | 4.4 ± 0.4 | 72 ± 5.7 |
| Dutch cap | 8 | 17 | 30 | 2.6 ± 0.4 | 79 ± 6.6 |
| Dumas cap | 1 | 0 | 2 | 3.7 | — |
| Unidentified .. | 12 | 26 | 27 | 6 ± 0.7 | 69 ± 7.4 |
| <i>Total Rubber Cap</i> .. | 38 | 63 | 103 | 4.3 ± 0.3 | 73 ± 3.7 |

* Doubtful case, see text.

TABLE V—continued

RELIABILITY OF CONTRACEPTIVE METHODS

| Method | Failed | Successful, less than One Year | Successful, over One Year | Mean Duration of Successful Period, in Years | Percentage of Success |
|--|--------|--------------------------------------|---------------------------------|---|-----------------------------|
| (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Quinine Soluble Pessaries alone</i> | 33 | 49 | 38 | 5 ± 0.7 | 54 ± 5.9 |
| Quinine + syringing .. | 3 | 5 | 16 | 4 ± 1 | 84 ± 8.4 |
| Quinine + sponge .. | 0 | 0 | 1 | 3 | — |
| <i>Total Quinine + another method</i> | 3 | 5 | 17 | 4 ± 1 | 85 ± 8 |
| Quinine powder insuffla- tion | 1 | 0 | 0 | — | — |
| <i>Soluble Pessaries—</i> | | | | | |
| Vimule | 0 | 1 | 1 | 12 | — |
| Semori | 0 | 4 | 0 | — | — |
| Speton | 2 | 1 | 0 | — | — |
| Chinosol | 0 | 0 | 1 | 10 | — |
| Lactic acid | 1 | 1 | 0 | — | — |
| Oxygen | 1 | 0 | 0 | — | — |
| <i>Jellies—</i> | | | | | |
| Patentex | 0 | 0 | 1 | 1 | — |
| Contraceptaline .. | 1 | 0 | 0 | — | — |
| Syringing | 19 | 12 | 7 | 4 | 27 ± 9 |
| Safe period | | | (see below) | | |
| Sponge | 6 | 5 | 0 | — | — |
| Lactation | 3 | 2 | 1 | — | — |
| Gräfenberg ring .. | 1 | 0 | 0 | — | — |
| Micturition | 0 | 0 | 1 | — | — |
| Sexual variations .. | 0 | 0 | 3 | — | — |

Column (4) includes the questionnaires in which a method is stated to have been used without failure, and the period for which it has been used includes at least one continuous year. It must not be taken for granted that all the cases in this column are proved successes. A few are childless marriages which may or may not be due to natural sterility. In other cases the relation between the successful period and the periods elapsing between giving up contraceptive methods and an intentional pregnancy provides further evidence which will be discussed when each method is considered separately.

Column (5) gives the mean duration of the period over which

TABLE VI

SUCCESSIVE FAILURES WITH VARIOUS CONTRACEPTIVE METHODS

| Method | Failures per Individual | | | | | |
|--------------------------|-------------------------|--------------|--------------------|-------------------|------------------------|----------------------------|
| | Failed Once | Failed Twice | Failed Three Times | Failed Five Times | Total Cases of Failure | Total Unwanted Pregnancies |
| Coitus interruptus alone | 25 | 11 | 2 | 1 | 39 | 58 |
| C.I. + syringing .. | 0 | 2 | — | — | 2 | 4 |
| Cervical cap | 14 | 2 | 1 | — | 17 | 21 |
| Quinine | 31 | 2 | — | — | 33 | 35 |
| Quinine + syringing .. | 1 | 2 | — | — | 3 | 5 |
| Syringing | 18 | — | — | 1 | 19 | 23 |

the method was used successfully. In some cases exact dates are given, so that the period was known fairly accurately. In other cases an estimation was made on the basis of all the information in the questionnaire. It is believed that these estimates have a probable error of not more than one year. In making the estimates some allowance was made for the lactation period, as probably reducing the chances of conception. Some of the periods consist of several discontinuous periods added together. Such discontinuous periods do not afford such good evidence of prevention of conception as one continuous period of the same total length. Further, many of the questionnaires are filled in by women of fifty or sixty or over. Here some date has to be taken for the cessation of active reproductive life. The age at which the menopause supervenes varies greatly

from one individual to another, and, moreover, the chances of reproduction diminish as the cessation of menstruation approaches. For the purposes of this investigation the purely arbitrary age of forty-two has been selected as the termination of active reproductive life, and all periods are calculated on that basis. In the Census reports marriages are regarded as being completed at the age of forty-five. The tables show a very rapid fall in fertility as this age is approached. By calculating periods up to forty-two some allowance is made for the decreasing probability of conception in later years. A more even comparison is possible between short and long periods. The mean duration of the successful period is given together with the standard deviation of the mean. The non-statistical reader should, however, be warned against the specious air of exactitude which statistical constants give to a table for which all that is claimed is that it is the most accurate estimate possible on the basis of the available data.

Column (6) gives the percentage of successes, being the ratio of Column (4) (successes) to the total of Columns (2) and (4) (failures and successes) multiplied by 100. The standard deviation of the mean is given, and the figures are subject to the qualifications mentioned in discussing (2) and (4). The merits of each method will now be considered in greater detail.

1. "*Sheath*."—It will be seen that the sheath heads the list of single methods for reliability, having 80 per cent. successes. It is obvious that failure of this method usually occurs through perforation of the sheath. This can take place in two ways. Either there may be in the material minute holes which are not easily seen, or a tear may occur during the process of copulation. Of the twenty-three failures, no reason is given in seven cases. In five the sheath was defective and in two it was torn. In nine cases after an initial failure, followed by substituting a more reliable make or by greater care in use, the sheath was later used successfully over a long period. Two other ways are believed to lead to failure in using the sheath. If the penis is inserted into the vagina before the sheath is put on, there may be a leakage of seminal fluid containing active spermatozoa, although ejaculation has not taken place. If the penis with sheath on remains in the vagina after ejaculation has taken place and the erection has subsided, the sheath may become loose and seminal fluid may ooze out of the top of the sheath and into the vagina. Neither of these two reasons for failure is given in the questionnaires.

The replies to the questionnaire did not disclose familiarity with

the most effective methods for the use of the sheath. The first cause of failure, minute holes, arises from defective or perished rubber. This can be avoided in the first place by testing the sheath before using, and in the second place, as rubber keeps best under water, by keeping the article in a closed jar containing water when it is not actually in use. It should, of course, be washed as promptly as practicable after intercourse and replaced in clean water. If this course is adopted the sheath is tested automatically every time it is cleansed, and the minute punctures which make their appearance after some months of use are at once detected when it is filled with water. This practice has three further advantages. A sheath of this type provided with a nipple can be fitted with sufficient water contained therein to dilute the seminal fluid and so diminish the chance of conception if breakage should occur. When fitted in this way the penis glides over the surface of the rubber without stretching it, so that in effect the sheath acts as a very efficient type of pessary. Besides diminishing the chance of tearing, this reduces to a minimum the intra-urethral pressure which perhaps accounts partly for the very pronounced disinclination of many males to use the sheath in spite of its relative reliability. When the sheath is fitted in the dry condition the rubber may become tightly stretched across the urethral orifice, impeding ejaculation. This source of discomfort is not entirely removed by the use of a sheath with a terminal nipple, because the latter readily becomes folded over. The advice usually given is to keep the sheath in powder, such as French chalk; but water is better, as advised by Stopes for preserving rubber caps. It would appear that with proper care the percentage of success with the sheath could be raised to at least 90 per cent. Unless an unbreakable sheath is invented, the sheath alone can never be highly reliable, as tears do sometimes occur. The great advantage which a sheath possesses over other methods of a similar degree of reliability is that when a failure of this kind occurs it is known immediately. This can only be taken advantage of if some other contraceptive is kept in reserve. Its use then comes under the category of double methods.

With regard to the 106 successful cases there are two in which no pregnancy had occurred, the marriage having lasted one and five years respectively. In eighty cases the method was given up in order that pregnancy might ensue, and in many cases more than once. This resulted in 102 intentional pregnancies and two failures to become pregnant. In the majority of cases pregnancy was immediate.

There were four cases which appear very dubious successes when the length of time required to conceive after the method was stopped is compared with the length of time over which the method had been used successfully.

2. "*Sheath*" and *Other Methods*.—The efficacy of double methods in general will be discussed in a later paragraph. The single case of failure has already been described. If this had been regarded as no failure, as might reasonably have been done, the percentage of success would have appeared as 100 per cent. It is clear that such a figure does not indicate infallibility, since if two methods, both of which can fail, are used together, the chance of failure, though very much reduced, can never be eliminated altogether. In practice the percentage of success with the sheath and any other method appears to be very high. When the sheath and syringing are stated to have been used together, it frequently happens that the syringe has not been used habitually, but only when an accident has occurred.

3. "*Coitus Interruptus*."—The figures given for this method are chiefly of interest from the point of view of its effect on population. It is a method very widely used, both now and over a very long period of human history. Although rarely recommended by any contemporary medical authority, there is a widespread belief that it is a reliable method. This is not substantiated by the present data. The causes of failure are, either failure to withdraw at the right moment, or leakage of fluid containing spermatozoa before the main discharge takes place. Of the thirty-nine failures listed, no reason is given in thirty-four cases. In two it is attributed to failure to withdraw in time, and in three to impregnation before ejaculation. The latter source of failure is possibly the more common. If so, it is a fatal objection to this method, since no amount of care can obviate it. In the seventy-seven successful cases there are seven childless marriages, and two of these appear to be sterile, as conception was attempted without success. The method was given up to produce offspring in forty-two cases, excluding the two just mentioned. Two of these are dubious successes. One was a woman whose husband practised coitus interruptus successfully for one and a half years, but when the practice was given up pregnancy did not ensue for twelve years. It will be noticed that the mean duration of the successful period for the method is decidedly longer than for other principal methods. If allowance were made for this the percentages of successes compared with the other methods might be slightly higher than it is.

No points of interest emerge in connection with the simultaneous use of coitus interruptus and another method. For obvious reasons the results are more successful than when coitus interruptus is used alone.

4. *Rubber Cap*.—This method calls for more detailed consideration. Among those who used rubber caps are several examples of individuals who used a cap in one way unsuccessfully and succeeded subsequently when a cap was used in another way. In compiling the rest of the preceding table, each entry corresponds to one individual's experience of a given method. In compiling the part dealing with rubber caps, one individual's experience of a cap is occasionally separated so as to appear as two entries. This happens once in the case of the cervical cap, three times in the case of the Dutch cap, and four times in the case of unidentified caps.

A. *Cervical Cap*.—Stopes claims a percentage of success of 95.5 per cent. for the cervical cap as recommended to several thousand cases at her clinic. This figure is not approached by the present data, which gives a percentage of reliability of 72 per cent. This, however, includes some individuals who were self-fitted and others who make no mention of using any chemical or grease as recommended by Stopes. In sixteen cases the cap was fitted by a doctor or midwife, and of these five are failures, so that this procedure evidently does not guarantee success. In forty-six cases either a chemical contraceptive or a douche was used in addition. These give a percentage of success of 77.5 per cent. There are only six cases where mention is made of a contraceptive jelly or ointment presumably applied round the edge of the cap. These are all successes, so that it is possible that this is the essential adjunct to this method. Among the seventeen failures, no reasons are given in five cases. For the remainder, the reasons given are:

| | | | | | | |
|----------------------------|----|----|----|----|----|---|
| Maladjustment | .. | .. | . | .. | .. | 7 |
| Wrong size | .. | .. | .. | .. | .. | 2 |
| Removal too soon | .. | .. | .. | .. | .. | 1 |
| No quinine used | .. | .. | .. | .. | .. | 1 |
| Displacement of the uterus | .. | .. | .. | .. | .. | 1 |

When the absence of quinine is given as the reason, the cap was used for eight years with or without quinine, and was stated to have failed once when quinine was not used. In addition to the case mentioned above, one other failure appeared to be due to a prolapsed

uterus. There also occurred two cases in which the method was abandoned after a short trial owing to a torn cervix causing difficulty in fitting. These include all the cases of physical defect in the reproductive organs. In four cases of failure with the use of the cervical cap another variety was tried, one Dumas, and three Dutch. In three of these the alternative was a success, but in the other the Dutch cap also failed.

Among the forty-four successes there were seven childless marriages, in two of which conception was attempted without success. In addition to the latter the method was given up with a view to producing offspring by twenty-eight women, resulting in three failures to conceive and forty-two intentional pregnancies. The more dubious successes include the two apparently sterile cases mentioned and the three where a failure to conceive occurred. From this source the evidence with reference to the reliability of the cervical cap may be summarised thus: The data presented indicate that in ordinary use, whether self-fitted or fitted by a professional person, and whether a chemical contraceptive is used or not, not much more than 75 per cent. of successes can be expected from this method. They also indicate that a contraceptive jelly or ointment smeared round the cap might add very considerably to its efficacy, but the number of cases on which this conclusion is based is very small.

B. Dutch Cap.—This method shows a percentage of successes of 79 per cent. The results are slightly better than those for the cervical cap. On the other hand, the duration of the successful period is little more than half. As before, the cases professionally fitted show no improvement. There are thirty-nine of these, with six failures, giving 78 per cent. of successes. All the cases except ten mention some additional precaution. None of these ten are failures. With regard to the use of ointment or jelly, six out of the eight failures used one of these, so that as far as the Dutch cap is concerned this does not seem to be an adequate precaution. The reasons given for the eight failures are as follows:

| | | | | | | |
|--------------------|----|----|----|----|----|---|
| Incorrect fitting | .. | .. | .. | .. | .. | 2 |
| Displaced cap | .. | .. | .. | .. | .. | 1 |
| Retroverted uterus | .. | .. | .. | .. | .. | 1 |
| Stretched cervix | .. | .. | .. | .. | .. | 1 |
| Removed too soon | .. | .. | .. | .. | .. | 1 |
| Careless placing | .. | .. | .. | .. | .. | 1 |

In the eighth case three reasons are given :

- (a) Cap distorted through use of greasy ointment.
- (b) Fitting by inexperienced doctor, hence wrong size.
- (c) Carelessness in douching.

In this and in two cases of incorrect fitting, the cap was later fitted properly and used with success. While nearly all those who failed with the cervical cap used quinine solubles, there are no failures with the Dutch cap and quinine. It is possible that the best additional contraceptive may differ in the two cases, but the data are too scanty to warrant any conclusion. In four cases the Dutch cap was abandoned for the cervical cap, which proved satisfactory. Among the thirty successes there are eight marriages with no pregnancies. The method was given up in order that pregnancy would ensue in twelve cases with immediate success. It must not be forgotten in comparing the percentages of successes for this method with others that it is based on a far larger number of short periods.

C. Dumas Cap.—The number of cases is too small to merit consideration.

D. Rubber Cap (Unidentified).—As the type of cap is not known, it would not be worth while to discuss these cases in detail, but the reasons given for failures may be cited. There are no failures among individuals fitted by a doctor or midwife in this group. No reasons for failure are given in three cases. In the remainder the reasons given are :

| | | | | | | |
|----------------------------------|----|----|----|----|----|---|
| Not properly fitted | .. | .. | .. | .. | .. | 1 |
| Misplaced | .. | .. | .. | .. | .. | 4 |
| Wrong size | .. | .. | .. | .. | .. | 2 |
| Rubber perished | .. | .. | .. | .. | .. | 1 |
| Use of jelly instead of ointment | .. | .. | .. | .. | .. | 1 |

In four of these cases the cap was persistently used again with success.

The results obtained for the use of the rubber caps in general give a percentage of successes with all types of 75 per cent. The majority of failures are clearly due to difficulties of fitting and adjustment. The absence of a suitable additional contraceptive may contribute. In practice it is difficult to separate the two factors. Clearly expert assistance and care in fitting and using the cap would tend to be accompanied by instruction in the use of additional precautions. The difficulty of using this method successfully is increased by the presence of uterine or cervical lesions.

5. *Quinine*.—The figures show that of all the popular methods, the quinine soluble pessary is the most unreliable, being as likely as not to fail. This result corroborates the findings of Dr. Baker (*Journal of Hygiene*, Vol. xxxi, No. 3, 1931), who found experimentally that quinine in cocoa butter had almost no effect on sperms. He made the suggestion that cocoa butter alone might have some mechanical effect on sperms.

In twenty-five cases of failure no reasons are given. The following reasons are given for the remaining failures:

Inserted too soon ..
 Inserted too late ..
 Inserted not far enough
 Inserted after intercourse
 Unreliable make ..
 Home-made pessaries ..
 Ejaculation too near uterus

In view of the doubts that have been cast on the efficacy of quinine in cocoa butter as a contraceptive, the thirty-eight successful cases will be examined in some detail. The mean duration of the successful period is similar to that of the other methods discussed. There are five marriages in which no pregnancy occurred. The method was given up in order to become pregnant in twenty-two cases. No pregnancy ensued in two cases, and in four cases the length of time

TABLE VII

| Method | No Pregnancy | Method given up to Procreate | Failure to Procreate | Dubious Cases |
|------------|--------------|------------------------------|----------------------|---------------|
| | Per Cent. | Per Cent. | Per Cent. | Per Cent. |
| Sheath .. | 2 | 75 | 2 | 4 |
| Quinine .. | 13 | 58 | 5 | 10 |

required to become pregnant was very long compared with the successful period. In order to facilitate comparison with the use of the sheath, for which the mean duration of the successful period is the same, the relevant facts are set out in Table VII, all the figures being expressed as percentages of the total number of cases.

As compared with the cases of success with the sheath, it is thus seen that a greater element of dubiety attaches to the successful cases of

the use of quinine. The latter include women who used quinine to space several successive pregnancies. In such cases the total period was considerable, but the probability that conception was actually prevented by the method employed is not very great. There remain four cases which appear to be undoubted successes:

- (a) Quinine used over a total period of seventeen years, up to the age of thirty-six, given up three times for procreation, followed by immediate pregnancy.
- (b) and (c) Used for four years, followed by immediate pregnancy.
- (d) Used for six years, followed by pregnancy in two months.

One individual mentioned gelatine as a base instead of cocoa butter. In this case the gelatine pessaries were used over a period of seven years successfully except on one occasion, when a cocoa butter pessary was substituted, and pregnancy followed.

It thus appears that in the majority of cases quinine in cocoa butter is useless as a contraceptive. There is evidence that in a few cases it has been effective. Whether this is due to the mechanical effect of the cocoa butter is not known at present.

6. *Other Chemical Contraceptives*.—It is unfortunate that the number of cases in this group is so small, as Baker's work on chemical contraceptives has provoked much discussion. In the paper to which reference has already been made certain soluble pessaries were tested for their spermicidal power and arranged as in the following list, only the ones mentioned in the questionnaires being included:

- 1. Semori.
- 2. Speton.
- 3. Chinosol.
- 4. Double-strength quinine.
- 5. Quinine, lactic acid.

The results obtained from "Speton" in the present material are not encouraging, but it would appear that "Semori" merits more extensive trials. Women who are engaged in practising birth control in order to limit their families could add very considerably to existing knowledge by arranging for a period of experimental birth control before each pregnancy. With many women the exact date of arrival of a child is not of very great moment. So that during the preceding period some new and attractive method of which the reliability has not been adequately tested could be used. The results might be placed on record through the medium of some such organisation

as the Birth Control Investigation Committee. For the experiment to have any value the method should be continued for at least a year, if no failure occurs.

7. *Syringing*.—From the table, syringing appears to be more unreliable than quinine as a method, having only 27 per cent. of successes. This method is likely to fail in all cases of copulation where the extremity of the penis reaches the os cervix, as spermatozoa may penetrate into the uterus before syringing takes place. Omitting the short period successes, there are twenty-six cases, of which nineteen are failures. The number of unwanted pregnancies is twenty-three. Seventeen either syringed with water or do not mention what substance was used. Substances mentioned as being used are—

| | | | | | |
|------------------------|----|----|----|----|----|
| Potassium permanganate | .. | .. | .. | .. | 2 |
| Quinine | .. | .. | .. | .. | .. |
| Quinine and oil | .. | .. | .. | .. | .. |
| Lysol | .. | .. | .. | .. | .. |
| Mercuric chloride | .. | .. | .. | .. | .. |
| Mercury biniodide | .. | .. | .. | .. | .. |
| Alum | .. | .. | .. | .. | .. |
| Salt | .. | .. | .. | .. | .. |

The successes among these are—

| | | | |
|------------------------|----|----|-----------------|
| Potassium permanganate | .. | .. | 1 (three years) |
| Quinine | .. | .. | 1 (one year) |
| Lysol | .. | .. | 1 (eight years) |
| Mercuric chloride | .. | .. | 1 (eight years) |

Some of these substances have been tested and graded by Baker for their spermicidal power ("The Spermicidal Power of Pure Contraceptives II: Pure Substances," *Journal of Hygiene*, Vol. xxxi, No. 2, 1931). His grading is compared with the results obtained in the present material in Table VIII.

The concentrations in which these substances were used are, of course, not known, but to some extent these results corroborate Baker's findings.

According to Steinhäuser, tap water kills sperms in ten seconds, but of the seventeen cases presumed to have used water, there are fourteen failures. The reasons given for the failure of syringing are:

| | | | | | | |
|--|----|----|----|----|----|----|
| No reason | .. | .. | .. | .. | .. | 14 |
| Delay | .. | .. | .. | .. | .. | 4 |
| Incomplete rupture of hymen making syringing difficult | .. | .. | .. | .. | .. | 1 |

The effect of syringing on health will be considered in another place. Whatever substance is used, in the majority of cases syringing does not appear to be very effective.

8. *Sponge*.—In view of the fact that this method is widely recommended, it is interesting to note that no successes for a period of over one year are recorded. With reference to the six failures, no description or reason for failure is given in three cases. No reason for failure was given in a case where the sponge was used with vinegar. In one case the sponge was said to have been displaced, and another indi-

TABLE VIII

| Substance | Grade | Result |
|------------------------------|---|------------------------|
| Mercuric chloride | Grade 8 Killing concentration $\frac{1}{258}$ per cent. | 1 Success |
| Potassium permanganate | Grade 4 Killing concentration $\frac{1}{18}$ per cent. | 1 Success 1 Failure |
| Potassium aluminium sulphate | Grade 2 Killing concentration $\frac{1}{4}$ per cent. | 1 Failure |
| Quinine | Grade 1 Killing concentration $\frac{1}{2}$ per cent. | 1 Success |

vidual who used the sponge with contraceptive line states that it was permeable and had become displaced.

9. *Lactation*.—The influence of lactation on the probability of conception has not been fully explored in the domain of human reproduction. Ludovici, a contemporary writer, with a strongly anti-feminist bias, has advocated protracted lactation as a means of limiting the size of the family to what he regards as reasonable dimensions, without recourse to such methods as are necessary if women are to pursue other callings in addition to motherhood. While direct evidence on this question does not provide conclusive support for the conclusion that lactation diminishes the likelihood of pregnancy, evidence derived from experiments on other mammals

strongly reinforces its plausibility. In the rabbit (Hammond) a very high percentage of abortion occurs if conception is allowed to take place while the doe is suckling. In the mouse (Parkes) the same is true. Strictly speaking, lactation as a means of limiting the size of the family, if it is effective as such in human beings, might be more properly classified under methods of abortion than contraception. However, it may be pointed out that abortion during lactation in mammals occurs at an exceedingly early stage, when it would not presumably involve any disturbances of a pathological nature. In the data presented, the one successful case history includes three lactation periods of four and a half, seven, and six months. After two of these periods, conceptions took place immediately lactation ceased.

10. *Miscellaneous*.—As only one case each of the Gräfenberg Ring and micturition regarded as a contraceptive method occurs, they need not be discussed. With regard to sexual variations, when practices are employed in which the penis does not approach the vagina, no conception can take place. "Karezza" (previously described) is believed to have resulted in conception on occasion. The reason for failure would be leakage such as occurs sometimes with coitus interruptus.

11. *Efficacy of Double Methods*.—If the percentage of success with two methods separately is known, the probable percentage of success when both are used simultaneously can be estimated. For example, the percentage of success with the use of the sheath is 82 per cent. Unity indicating certainty, the probability of failure is $\frac{18}{100}$. Quinine with a percentage of success of 54 per cent. will have a probability of failure of $\frac{46}{100}$. The probability of failure of the double method will be $\frac{18}{100} \times \frac{46}{100}$ giving a percentage success of 92 per cent. In the following table the estimated and observed percentages for three double methods are given with their standard deviations.

Although the probable errors of the theoretical percentages are enormous, it will be seen that in each case the success of the double method is rather greater than would be expected. This suggests that part of the efficacy of any double method is due to greater care and greater desire to prevent pregnancy.

Summary.—Tables V and VI should be considered together in order to arrive at a satisfactory estimate of the usefulness of any contraceptive method in limiting the size of the family. Taking into consideration the total number of unwanted pregnancies, it will be seen that the superior reliability of the sheath is greater than would appear from Table V alone. Coitus interruptus, on the other hand, is responsible for a very large number of unwanted pregnancies. This circumstance can in part be attributed to the fact that to a few individuals coitus interruptus was the only method of contraception known. Such persons continued to practise it in spite of repeated failures.

As far as the data warrant drawing any conclusions with regard to reliability, it is clear that the most reliable method is the sheath combined with the soluble pessary or syringing. This could be

TABLE IX

| Method | Theoretical Percentage of Success | Observed Percentage of Success |
|------------------------|-----------------------------------|--------------------------------|
| Sheath + quinine .. | 92 ± 19 | 100 ± 0 |
| Sheath + syringing .. | 87 ± 27 | 92 ± 7.8 |
| Quinine + syringing .. | 67 ± 46 | 84 ± 8.4 |

expected to yield not more than 5 per cent. failures on a very cautious estimate. In the neighbourhood of 20 per cent. failures come the sheath alone, coitus interruptus with some other method, and the combination of quinine and syringing. The data contained in the questionnaire of the Birth Control Investigation Committee do not encourage great confidence in the rubber cap. It will be necessary to reconsider this conclusion in the light of data derived from other sources. The following methods have little reliability:

Coitus interruptus alone;
 Quinine soluble pessaries alone;
 Syringing alone;
 The "safe period" alone, as this term is commonly understood;
 The sponge; and
 Lactation.

With regard to other methods mentioned in the table, the data are inadequate.

CHAPTER IV

PERSONAL REACTIONS TO CONTRACEPTIVE METHODS

In recommending a contraceptive method, reliability is not the only factor of importance to be considered. For example, methods may involve a technique too troublesome or too difficult for the average woman, or they may interfere with the pleasure of sexual intercourse. Such factors, in so far as they relate to particular methods, will be considered in the present section.

A general view of the results of the present enquiry under this heading can be obtained from Table X. Column 1 gives the number of cases in which the method was tried; Column 2 the number in which it was the only method used; Column 3 the number of cases in which more than one method was tried and the one concerned found to be the best; Column 4 is the total of 2 and 3; and Column 5 gives the ratio of 4 to 1, i.e. the percentages of satisfactory cases; Column 6 gives the number of cases in which the method was abandoned for reasons other than an unwanted pregnancy; and in Column 7 an attempt was made to give a very rough estimate of the attractiveness of the different methods from other aspects than that of reliability. This was done by expressing the figures in Column 6 as a percentage of the occurrences. The percentages will be lower for the more attractive methods, but the figures are of value only for comparison within the range of the given material. It must, moreover, be remembered that if a method is very unreliable it is less likely that it will be given a trial and then discarded for other reasons, since pregnancy may have ensued before dissatisfaction leads to the substitution of another method.

Sheath.—Among individuals who rely on the sheath as the best method, few give detailed reasons for their preference. The most common reason is that this procedure involves little trouble. Some stressed the point that no previous preparation is needed. In several cases the method is said to allow of complete physical satisfaction without any discomfort. Two individuals point out that the sheath is not expensive, if due care is taken. For those who rely on it the chief merit of the sheath, apart from safety, lies in its freedom from the inconveniences and discomforts pertaining to other methods.

The most frequent objection raised to the use of the sheath is

dislike on the part of the husband. In four cases this is said to interfere with potency. The answers supplied in questionnaires written by husbands might be considered as evidence on this point. Nine

TABLE X

| Preferred Methods | | | | | | Methods Abandoned for Reasons other than Failure | |
|-----------------------------|------------|--------------|------|--------------------|-------------------|--|-------------------|
| Method | Occurrence | Sole | Best | Total Satisfactory | Percentage 4 of 1 | Number of Cases | Percentage 6 of 1 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Sheath | 222 | 30 | 76 | 106 | 48±3 | 94 | 42±3 |
| Sheath + another method | 57 | 3 | 25 | 28 | 49±7 | 29 | 51±7 |
| Coitus interruptus .. | 197 | 36 | 38 | 74 | 38±3 | 93 | 47±4 |
| C.I. + another method .. | 15 | 1 | 7 | 8 | 53±13 | 5 | 33±12 |
| Cervical cap | 80* | 8 | 34 | 42 | 52*5±6 | 26 | 33±5 |
| Dutch cap | 52* | 5 | 26 | 31 | 60±7 | 16 | 31±6 |
| Total rubber cap | 196 | 19 | 84 | 103 | 53±3 | 68 | 35±3 |
| Quinine soluble pessaries.. | 120 | 14 | 30 | 44 | 31±4 | 47 | 39±4 |
| Quinine + another method | 25 | 5 | 5 | 10 | 40±10 | 12 | 48±10 |
| Other chemical methods .. | 15 | 2 | 4 | 6 | 40±13 | 5 | 33±12 |
| Syringing | 38 | 3 | 2 | 5 | 13±5 | 14 | 37±8 |
| Safe period | 32 | 3 | 6 | 9 | 28±8 | 4 | 13±17 |
| Sponging | 11 | 0 | 0 | 0 | 0 | 5 | 46— |
| Lactation | 6 | 0 | 0 | 0 | — | — | — |
| Gräfenberg ring | 1 | 0 | 0 | 0 | — | — | — |
| Vasectomy | 2 | 0 | 2 | 2 | — | — | — |
| Micturition | 1 | 0 | 1 | 1 | — | — | — |
| Sexual variations | 3 | 0 | 3 | 3 | — | — | — |
| Abstinence | 16 | 2 | 2 | 4 | 25±11 | 12 | 75±11 |
| | | 118 | 285 | 403 | | | |
| | | Undetermined | | 17 | | | |
| | | No method .. | | 12 | | | |
| | | | | 432 | | | |

cases mention the sheath, and of these five are in favour of it and four dislike it. One man advocates the use of a variety known as the "American Tip" which only covers the glans penis. Another mentions

* The discrepancy between these figures and corresponding figures in other tables is explained in the text.

the practice of commencing without the sheath and putting it on just before ejaculation. Much of the male dissatisfaction with the sheath could possibly be removed by a suitable technique such as that described in a previous section, which would obviate any sensations of discomfort or pain. There may remain a few types who, through lack of potency, would find the sheath a serious impediment to the completion of the sexual act.

From the point of view of the woman the most serious objection is lack of contact. This can be remedied to some extent by the procedure of commencing intercourse without the sheath. On the other hand some may object to the slight interruption. Stopes considers that the absorption of seminal fluid through the vaginal wall is of great benefit to the female. No experimental evidence derived from physiological enquiry into mammalian reproduction supports this supposition. The issue is raised by a few of the writers of the questionnaires. Whether any such absorption is of importance or not is a matter concerning which opinion seems to be about equally divided. This is obviously an issue which cannot be illuminated by personal testimony in the absence of controlled experiment. In twelve cases complaint is made of discomfort, irritation or pain caused by the use of the sheath. This trouble could probably be avoided either by the use of the sheath wet, as previously suggested, or by the use of some other lubricant. Ten women state they cannot obtain complete physical satisfaction when the sheath is used. In one case the sheath is said to have accelerated ejaculation, which is very exceptional. Usually the sheath prolongs the process of copulation in the male. The female is benefited as her orgasm in the majority of cases takes longer to achieve than that of the male. Several writers describe the sheath as too noticeable. A few more make use of adjectives such as inartistic, prosaic, and unromantic. The foregoing constitute a group of reactions which can only be described for want of a better term as aesthetic. They are too numerous to be ignored, but whether they can be overcome, other than by habituation, is a question which does not appear to admit of solution at present. In two cases the sheath was alleged to have caused bladder trouble in the male, and in one to have caused local ulcers in the female.

Where the disadvantages of the sheath are of an obviously physical nature, they can be largely mitigated by the use of a suitable technique. There will remain certain cases where, through deficiency of potency, the method is contra-indicated. The technique required

is very simple, more so than with the rubber cap, but can be hardly described as completely "foolproof".

Coitus Interruptus.—Contemporary psychiatrists in this country are practically unanimous in regarding coitus interruptus as productive of very harmful psychological effects. The replies of individuals who adopted coitus interruptus as their sole method therefore demand close scrutiny. Where coitus interruptus was the sole method employed, five statements are made concerning the bad effect of the practice. In one case loss of potency on the part of the male is indicated. On the other hand six individuals testify in very strong terms that they have enjoyed a very high degree of health and happiness over a large number of years. Generally speaking, the following reasons are given for preferring coitus interruptus to other methods:

- (i) Distaste for use of contraceptive devices;
- (ii) That it is no trouble;
- (iii) That it involves neither previous preparation nor expense.

The testimony to the bad effects of coitus interruptus is very strong. Most of the remarks are expressed in language which cannot be given an exact scientific meaning, but which undoubtedly indicates a very genuine reaction on the part of the individual testifying. In twenty-four cases the wife stated that she obtained no physical satisfaction. Several writers speak of the method as being unpleasant, harmful, or causing nervous strain. In thirteen cases it was said to have caused a "severe shock to the nervous system". In four cases insomnia followed. The bad effect on the husband's health and nervous system is commented upon several times. The few replies from husbands for the most part express no objection to coitus interruptus. It would appear that in the majority of cases the wife suffers most obviously and seriously from the use of this method. The total number of replies which refer to the deleterious effects of coitus interruptus is twenty-six. This number does not include those replies already referred to in which the woman remained unsatisfied. If the absence of sexual satisfaction may be safely presumed to have disadvantageous results in the long run, the total number of unfavourable comments may be given as fifty.

Cervical Cap.—The chief advantage of this method, frequently mentioned in the questionnaires, is that neither partner is aware of the presence of the cap during sexual intercourse in the majority of

cases. This fact, combined with two other considerations, namely, that it can be put in position some time before union, and that nothing more need be done for some time after, enable intercourse to take place with a minimum of distraction. The advantages have been set forth at great length by Stopes, the most prominent and enthusiastic advocate of this type of cap. That the method has real merit from the present standpoint is indicated by the fact that the percentage of cases of satisfactory use is high compared with more reliable methods.

The most frequent source of dissatisfaction is difficulty in fitting and adjusting. Probably closely connected is a feeling of insecurity which sometimes leads to the method being abandoned, although no failure has occurred. Many of these individuals would doubtless have found the method satisfactory if they had received expert fitting and instruction. In three replies the cap was described as being painful and uncomfortable in use. In two or three cases there were evidently objections to the process of insertion and removal and the necessary cleaning of the cap. In three cases the method is stated to be too much trouble. In view of the measures which women will take to procure abortions this can hardly be regarded as a valid objection to the method in itself, but there would naturally be a tendency to substitute a less troublesome method. In one reply, which may be presumed to have come from India, the method was abandoned because rubber perished too quickly in the heat. Adjuncts to the method, such as greasiness of other contraceptives used, and bad effects of quinine constituted objections in some instances. Finally, there are three cases which involve anatomical difficulties. In one a prolapsed uterus caused the cap to be perceptible during intercourse. In one a cap could not be fitted owing to a cervical tear. In one the smallest size manufactured proved too large.

The cervical cap method has very valuable qualities. Most of the dissatisfaction could probably be removed by expert supervision and improvement in the technique of additional contraceptive methods. There would remain certain cases in which the method would be definitely unsuitable, as when anatomical peculiarities or lesions of the genital tract exist. The cap can obviously not be used by a virgin unless artificial perforation of the hymen is employed.

Dutch Cap.—The advantages of the Dutch cap method are similar to those of the cervical cap method. In three cases it was definitely stated that the cap permitted an orgasm to take place in both male

and female, whereas the sheath and coitus interruptus did not. In four cases the Dutch cap was found easier to insert than the cervical cap.

Drawbacks are somewhat similar in the two methods. Discomfort, a feeling of insecurity, dislike for manipulation and preliminary preparation are all mentioned. In three cases the cap could be felt by the male during intercourse. In one case the cap could not be used owing to a retroverted uterus, in one case it was supposed to aggravate leucorrhoea, and in two an unusually narrow vagina proved an obstacle to its insertion. In one case the cap was said to "have drawn down the womb" and caused illness. The figures given in the preceding table indicate that the Dutch cap is slightly more popular than the cervical cap. The difference can be chiefly attributed to greater ease of fitting and manipulation in the former case.

The chief points in connection with the use of any variety of rubber cap may be summarised as follows:

1. The advantage of having a method which is unnoticeable during and immediately before and after intercourse holds good for many cases, but not in all. The cap may constitute a definite impediment to sexual intercourse when, as occurs with persons who have an experienced technique, penetration is maximal.

2. Objections exist in some cases to the process of insertion and removal of caps and to the necessary cleaning.

3. The method appears to be far from foolproof. Even with expert instruction there still remains need for forethought, care and attention to hygiene. There was no evidence in the replies that caps were left in for over-long periods. The maximum period was a few days. The usual practice was to place the cap in position some time during the day or at night and remove it in the morning.

4. Difficulties arise in connection with some of the adjuncts to the rubber cap method, e.g. quinine and syringing. These are discussed elsewhere.

5. Certain physical types cannot use this method satisfactorily.

Quinine.—The use of the quinine soluble pessary as a contraceptive has the advantage of interposing no barrier between the male and female. The process requires only the previous preparation of obtaining the article, and the act of insertion is but a slight interruption in the process of sexual intercourse. These points are all brought out in the questionnaires.

Several drawbacks are mentioned. In seven cases the quinine is

said to have caused local irritation, and in two cases to have resulted in malaise or giddiness. The grease and resultant soiling of bed linen are found to be objectionable. Five users object to the odour of the pessaries. This can be overcome to some extent by having the pessaries scented. "Vimule" pessaries, which are made up with a base of cocola, are said to be practically odourless. The method is described in a very few cases as unattractive or too expensive.

The fairly frequent idiosyncrasies to quinine evidently contraindicate this method in certain cases. For the majority of persons the method appears to be on the whole attractive, and if it were more reliable the fact that it is practically foolproof would be an additional merit.

Quinine and Urea.—Quinine and urea soluble pessaries are now frequently prescribed for use with a rubber cap. Carleton and Florey (*Journ. Obst. and Gyn. of the B.E.*, Vol. 38, No. 3) found that quinine and urea, when injected into the vaginae, produced intense vaginitis in rabbits and dogs. Among the cases already studied in which some form of quinine pessaries was used in conjunction with a rubber cap, three individuals stated that quinine and urea pessaries were used. The periods during which the pessaries were used were two years, one year, and seventeen months. All the cases were successes, and no mention is made in the questionnaires of any adverse effect on health.

Other Chemical Contraceptives.—The data with regard to other chemical methods are very scanty. They appear, on the whole, to give personal satisfaction to those who use them. "Semori" is alleged to have caused slight vaginitis in one case, and in another is objected to on the grounds of expense.

Syringing.—Many reputable gynaecologists regard the habitual use of a vaginal syringe as detrimental to health. It is believed by them to eliminate the protective bacteria in the vagina and thus to facilitate infections such as leucorrhoea. As far as the present material is concerned, this theory is unsubstantiated. No evidence is brought forward to indicate any detrimental effects on the health of the female. Where mercury biniodide was used, the ensuing pregnancy resulted in a still-born child, and the suggestion was made that the two events might be connected. The use of such highly toxic substances as the mercury compounds must be attended with some risk.

The objection most frequently mentioned and most serious is the

extreme inconvenience of the process of getting out of bed immediately after intercourse in order to syringe. The method can hardly be regarded as foolproof in spite of its apparent simplicity. Considerable determination is often required to carry it out with sufficient promptitude.

Sponge.—Little is said concerning the use of the sponge. In isolated cases it was said to be uncomfortable, to be perceptible during intercourse, and to be difficult to clean. When soap or vinegar was used, these substances had unpleasant effects.

In the present section nothing remains to be said concerning other methods practised, since the data are too fragmentary to merit discussion. Abstinence was said to be the sole means of family limitation in two cases. Of these two one was a missionary's wife who practised it over a period of twelve years. Before this period there apparently occurred one miscarriage and one living child. The individual concerned states that she is happy and physically fit, and that she believes birth control to be socially and physically detrimental. The second case is that of the wife of a man holding a managerial post. The exact period of abstinence is not stated, but the marriage extended over seventeen years. Three children were born. Abstinence was said to have been given up immediately before each conception. The opinion is expressed that artificial birth control is detrimental to love and respect and conducive to immorality. There remain fourteen individuals who combined abstinence over protracted periods with the use of contraceptive practice at other times. Two of the individuals concerned consider abstinence to be the healthiest and happiest way of spacing the births of children by two to four years. One of these reserves judgment concerning its value when future conception would be undesirable. It is not clear how long she practised abstinence. Seemingly she abstained for two periods of five months and about one year respectively. Marriage took place in 1926, and two children were born. In the second case abstinence was practised for a period of nine years, commencing at the age of thirty-eight, four children having been born previously. The opinions of the writer are not very clear. The other methods tried were the "safe period" and coitus interruptus, both of which failed. They were abandoned because not "even the smallest risk could be faced". In the answer to Question 10, total abstention is described as "nature's own method". In the answer to Question 12 "interference with normal sex life" is regarded as "detrimental".

mental". She states that "even with great mutual devotion it is often difficult to maintain a level balance of nerves and temper". On the whole this reply cannot be regarded as enthusiastic.

Of the remaining twelve cases, four yield no evidence of general interest. Eight writers consider that abstinence has bad effects of a psychological nature. A typical remark is "disastrous to nerves and contentment". These replies all refer to effects on the female, but some also describe a similar effect on the male. In one case puerperal mania after the birth of the first child is attributed to a period of four and a half years' abstinence immediately preceding. This is, of course, pure supposition, but it is mentioned because similar suppositions have been recorded in connection with other means of family limitation. In two of the above cases it is considered that under certain circumstances abstinence for short periods can be employed without ill-effects. Taken as a whole, the balance of opinion among individuals belonging to this small group of women who stated that they had practised abstinence is unfavourable to it.

Summary.—The effects of individual methods on health are difficult to assess. In the majority of cases there was clearly no evidence available to the writers of the questionnaires.

Supposititious ill-effects were alleged to have occurred in isolated cases after the use of the sheath, a rubber cap, syringing with mercury biniodide, and abstinence. In the case of quinine, there is more definite evidence pointing to the conclusion that local irritation may ensue, and, more rarely, general malaise. With the exception of quinine, there is no clear indication from the statements contained in the questionnaires that any ill-effects on health can be traced to the use of any particular method. There is a considerable body of evidence to indicate that in many cases, though not in all, coitus interruptus can have detrimental effects on nervous stability and happiness. On the whole, the other methods do not appear to have any ill-effect. The possible effect of contraception on sterility will be discussed elsewhere.

Any method of contraception which requires no care or forethought in use would be of great practical utility. None of the methods at present in vogue approach this ideal. Probably chemical contraceptives are the best from the point of view of practicability. The two most reliable methods in common use, the sheath and the rubber cap, both require care and an adequate technique to ensure satisfaction. Of the two most popular varieties of rubber cap, the Dutch

cap appears to be the easier to manipulate. In this connection it may be pointed out that any method which, like the sheath, depends on the co-operation of the male is clearly limited in its application. Under the ambiguous heading of aesthetic objections can be classed a variety of reactions to contraceptive methods which vary very greatly from one individual to another. Each type of method appears to please some persons and to be objectionable to others. The table given at the beginning of this section shows that the sheath and the rubber cap proved the most satisfactory methods from every point of view, while the sponge and syringing proved least satisfactory to the writers of these questionnaires. Coitus interruptus and quinine occupy an intermediate position. The Dutch cap proved more satisfactory than the cervical, but it must not be forgotten that the length of time during which the method had been in use was considerably shorter for the former. The considerations put forward in this and the preceding section point to the conclusion that it is inadvisable for clinics to recommend one method exclusively. No method at present in use is ideal, and different individuals may find themselves best suited by one or other of the existing methods. For similar reasons it would be advisable that research should be carried on in many different directions, so that, pending the discovery of the ideal contraceptive, more than one of the present methods could be improved.

CHAPTER V

THE ACCREDITABLE DATA

The data contained in a questionnaire are all subject to the objection that they rest upon individual testimony which is not actually substantiated by the confirmation of independent witnesses. It is of some importance to recognize that such data may be of a kind which is amenable to public demonstration in the latter sense, while other data are not such as are capable of being checked by independent observation, or at least are not likely to be. For instance, if a person states that she has three children, her statement could readily be checked if necessity arose. It is reasonable to assume that in the majority of cases where individuals make statements of this kind they have been accustomed by social training to veracity. On the other hand, if an individual makes a statement concerning the frequency with which she enjoys sexual gratification, we have at present no available means of testing her veracity with assurance, and we may reasonably assume that she has not been accustomed by social training to habitual veracity on such matters. The data contained in a questionnaire are not independently accredited data. Nevertheless, we can distinguish between two categories of such data, namely, those which are *accreditable* and those which are not. There is every reason to suppose that people are, on the whole, more accurate when there is some possibility that their statements will be scrutinised in the light of facts which other individuals can observe. Hence greater credibility attaches to replies which are concerned with *accreditable* data. Such data correspond most closely to the requirements of a truly scientific analysis of the problems we are discussing, based on how human beings actually behave. For that reason the present chapter will be devoted to an examination of the significance of the *accreditable* data contained in these questionnaires.

The first data to be presented deal with the effect of contraception on the mean size of the family. No adequate treatment of the effect of birth control on the size of the family can be attempted with the limited data available. As in a previous section tabulation has had to be confined to the cases where one method only was used and to the large groups of successful and unsuccessful use of contraception. In the first part of Table XI the total number of cases available are

tabulated. In the second part of the table the number of cases has been reduced in each group by discarding either the longer or the shorter periods so as to make the mean duration equal to that of the group employing no means of birth control. The duration in all cases is the duration of active reproductive life, as defined earlier. The duration of married life would be somewhat longer. In the group using no contraceptive method the mean duration of married life was seventeen years.

TABLE XI

EFFECT OF CONTRACEPTIVE METHODS ON THE MEAN SIZE OF FAMILY

| Number of Cases | Method | Mean Duration of Reproductive Period (Years) | Pregnancies | Children Born Alive |
|---|--------------|--|----------------|---------------------|
| <i>A. Uncorrected</i> | | | | |
| 12 | None | 14 ± 2.0 | 4.5 ± 0.87 | 4.0 ± 0.84 |
| 36 | C.I. | 15 ± 0.8 | 2.9 ± 0.42 | 2.6 ± 0.42 |
| 30 | Sheath | 10 ± 0.9 | 2.1 ± 0.21 | 1.7 ± 0.15 |
| 14 | Quinine | 12.5 ± 1.1 | 3.8 ± 0.57 | 2.7 ± 0.41 |
| 19 | Rubber cap | 8 ± 1.1 | 2.0 ± 0.34 | 1.8 ± 0.32 |
| 2 | Abstinence | 17 | 2.5 | 2 |
| 271 | Successful | 10.7 ± 0.3 | 2.2 ± 0.10 | 1.9 ± 0.08 |
| 149 | Unsuccessful | 14.6 ± 0.5 | 3.7 ± 0.17 | 2.9 ± 0.14 |
| <i>B. Corrected for Duration of Reproductive Period</i> | | | | |
| 12 | None | 14 ± 2.0 | 4.5 ± 0.87 | 4.0 ± 0.84 |
| 31 | C.I. | 14 ± 0.8 | 2.6 ± 0.4 | 2.6 ± 0.4 |
| 14 | Sheath | 14 ± 0.7 | 2.1 ± 0.26 | 1.8 ± 0.21 |
| 11 | Quinine | 14 ± 0.9 | 4.4 ± 0.85 | 3.0 ± 0.76 |
| 5 | Rubber cap | 14 | 3.8 | 3.6 |
| 175 | Successful | 14 ± 0.3 | 2.8 ± 0.13 | 2.4 ± 0.13 |
| 134 | Unsuccessful | 14 ± 0.5 | 3.5 ± 0.15 | 2.7 ± 0.14 |

The group using no contraceptive method was too small to be of any real value as a control. It can, however, be compared with the Census figures for 1911, where the crude birth-rate for marriages of fifteen–twenty years' duration for all classes of occupied persons is 4.07 per family. For Class I it is 2.9. The Census figures included a proportion of families where contraception was used, and there is

no available information as to the size of the family in any comparable group in which contraception was not used. The table corroborates to some extent that already given for the reliability of the different methods. The difference between the sizes of the family where contraception is successfully practised and where it is not practised would probably be increased if only completed marriages were included. It is fairly safe to assume that in some of the cases of successful use of contraception no further addition to the family is contemplated. The most striking facts disclosed by this table are the high reliability of the sheath and the low reliability of quinine. The position occupied by the rubber cap is problematical.

In the following pages an attempt has been made to apply an objective criterion for the reliability of various contraceptive methods independently of any unaccreditable statements made by the individuals concerned. Contingency tables (XII-XXV) are presented in which the number of pregnancies and the number of children born alive are given for different periods of reproductive life. These will be found in the Appendix (pp. 179-188). This has been done for all cases in which one contraceptive method was used exclusively, for cases in which no contraceptive method was employed, and for the two large groups in which contraception was practised successfully or unsuccessfully. The table given for quinine includes those cases in which quinine was the sole method used, and those in which quinine followed by syringing was the sole method used. The correlation coefficients obtained from the tables, together with their standard deviations, are set out in Table XXVI. Correlation coefficients based on less than thirty cases are not usually regarded as having any statistical value. Some of the tables presented fall far below this standard. They are, however, included, since the present chapter is not regarded as necessarily leading to any final conclusions. They provide a suggestion for a new method of approach which might repay further investigation.

The significance of these results is by no means obvious. However, the values obtained for the correlation coefficients derived from the contingency tables here set forth prove to be suggestive on closer examination. In the first place it is evident that for marriages of two normally fertile individuals the number of children born will increase with the duration of marriage, unless some factors intervene to prevent more children being born as the duration of marriage increases. Without recourse to contraceptive practice or abstinence,

correlation between duration of marriage and number of pregnancies would be wellnigh perfect except in so far as there may be a small drop in natural fertility as age advances. Although statisticians, following Newsholme, are disposed to assume that such a drop exists, the available evidence does not discriminate between such agencies as viability of the sperm or the early embryo and regularity of ovulation on the one hand in contradistinction to diminished sexual activity, stability of marriage, or contraceptive practice on the other. Whatever significance attaches to the diminution of natural fertility as the duration of marriage increases, it is safe to presume that a

TABLE XXVI

CORRELATION COEFFICIENTS

*Number of Pregnancies or Children Born Alive Correlated with
Duration of Reproductive Life*

| | Number of Cases | Pregnancies | | Children Born Alive | |
|-------------------------------|--------------------|-------------|------------|---------------------|------------|
| | | r | σ_r | r | σ_r |
| No contraceptive method .. | 12 | 0·467 | 0·223 | 0·641 | 0·170 |
| Sheath used only | 30 | 0·045 | 0·182 | 0·044 | 0·182 |
| Coitus interruptus used only | 36 | 0·331 | 0·148 | 0·272 | 0·158 |
| Rubber cap used only .. | 19 | 0·719 | 0·111 | 0·805 | 0·081 |
| Quinine | 19 | 0·620 | 0·141 | 0·316 | 0·206 |
| Unsuccessful contraception .. | 149 | 0·564 | 0·056 | 0·494 | 0·062 |
| Successful contraception .. | 271 | 0·499 | 0·046 | 0·506 | 0·045 |

high correlation coefficient will generally be found when both partners of the union are normally fertile and in the absence of contraceptive practice or abstinence. Conversely, a low correlation coefficient for unions of which neither partner practises birth control or abstinence may be taken to signify low natural fertility in some members of the group.

A correlation coefficient for duration of reproductive life and the number of pregnancies or births measures the tendency for the number of births or pregnancies to increase (or decrease) as the number of years of married life increases. This measure does not

depend upon the spacing of births or pregnancies, providing the spacing is comparatively uniform. Thus a high correlation coefficient, e.g. 0.5 — 1, signifies either that the measures adopted are unreliable, or that being reliable they are used to increase the interval between successive births rather than to keep down the number of children to some arbitrary limit of small dimensions compared with the number of pregnancies that would occur during a protracted fertile union. Conversely, a low coefficient of correlation (e.g. appreciably less than 0.5) signifies that the method is sufficiently reliable to ensure that in general the number of children born will not exceed an arbitrary limit normally reached at an early stage in the duration of married life and comparatively small as compared with the frequency of conception in the absence of artificial restrictions.

To put the matter in another way, low correlation between frequency of conception and duration of reproductive life, if associated with contraceptive practice, may be taken to indicate that the method employed is comparatively reliable. On the other hand, a high correlation associated with a particular method does not permit us to argue that such a method is unreliable. A high correlation might result from unreliability of the method. It might also result from the fact that the sample included many marriages of short duration, containing no period of protracted artificial infertility. A more subtle and socially significant point is that high correlation is consistent with high reliability, *provided that the method is employed to space the number of births rather than to limit the total number of children born to a fixed number.*

In practically all cases of the use of a single method the use of the method may be taken to be coextensive with the whole of married life, excluding pregnancies. If a method is used to restrict the number of children to some small number, e.g. two, a high correlation might be consistent with high reliability as stated above if the group examined were largely composed of unions of short duration. Hence the comparison of results obtained with different methods is not legitimate unless attention is paid to the distribution of marriages of different durations. Frequency polygons for the groups examined above are given in Figs. 1-7.

It may now be asked whether it is possible to obtain any approximate measure of individual preference on the lines of the present treatment of the reliability of the methods employed. One that suggests itself is to take all individuals who had used more than one method and

for each method to correlate its duration of use with the duration of married life. As in the previous discussion, the significance of the correlation coefficients must be interpreted with great circumspection, and it is regrettable that all the requisite data for this analysis

FREQUENCY POLYGONS.

DURATION OF REPRODUCTIVE PERIOD.

FIG. 1.
NO CONTRACEPTION

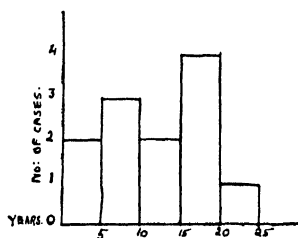


FIG. 2.
CAP

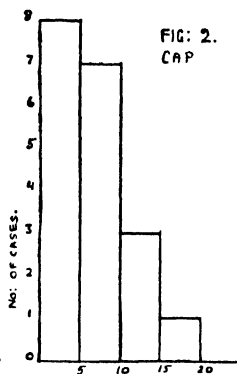


FIG. 3
QUININE

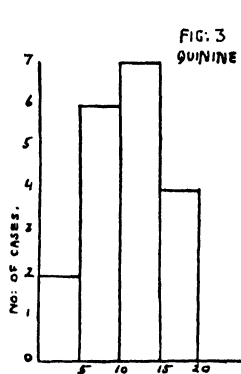


FIG. 4
SHEATH

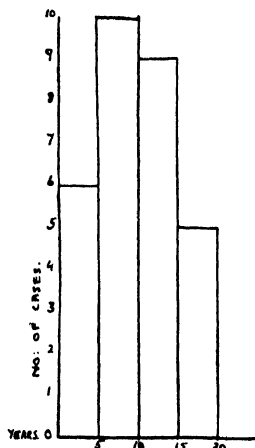
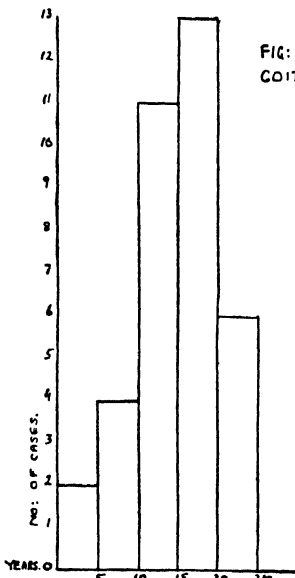


FIG. 5
COITUS INTERRUPTUS



or that of the preceding problem by the method of partial correlation are not available. In any case, preference estimated in terms of a correlation coefficient represents the outcome of the knowledge at the disposal of the individual in making a choice between two or

more methods; individual predilection apart from the reliability of the method selected on account of convenience or conformity to personal taste and scruples; and finally the disposition to employ the most reliable method obtainable.

FREQUENCY POLYGONS.

DURATION OF REPRODUCTIVE LIFE.

FIG: 6
SUCCESSFUL CONTRACEPTION

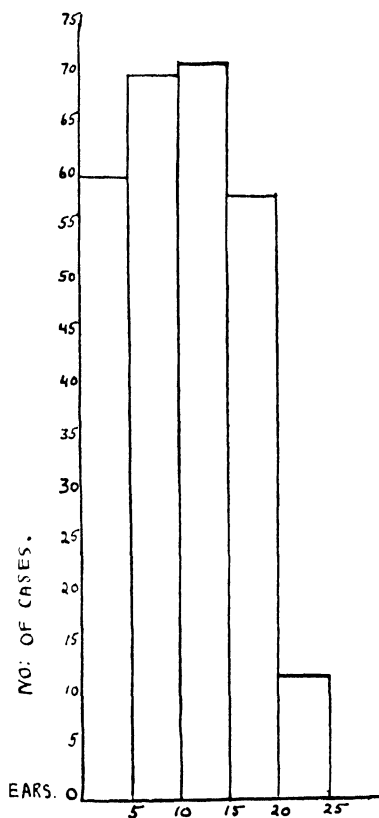
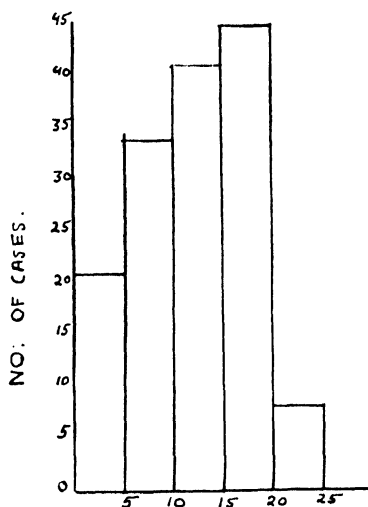


FIG: 7
UNSUCCESSFUL CONTRACEPTION



The coefficients given in Table XXVII show that the data contained in these questionnaires reveal no significant difference between the four principal methods of contraceptive practice dealt with above. The correlation between duration of use and duration of married life

is highest for the cap and lowest for coitus interruptus, but the difference between the two is less than one and a half times its standard deviation. The fact that correlation with the use of quinine is not significantly lower than that for the sheath, in spite of the considerable disparity in the reliability of the two methods, might encourage the suspicion that a chemical contraceptive would be generally preferred to other methods if it could be relied upon with equal assurance. Leaving out of account the use of quinine, the coefficients for the cap, the sheath and coitus interruptus rank in the same order as the personal testimony contained in the statements of the persons who answered the questionnaires, and this in spite of evidence both from personal testimony and the accreditable data pointing to the high reliability of the sheath.

TABLE XXVII

CORRELATION COEFFICIENTS

Duration of Reproductive Period and Duration of Period of Use of Contraceptive Method

| | r | σ_r |
|-----------------------|-------|------------|
| Sheath | 0.438 | 0.059 |
| Coitus interruptus .. | 0.347 | 0.070 |
| Cap | 0.453 | 0.062 |
| Quinine | 0.394 | 0.082 |

From this source the information obtained is somewhat meagre. So far as it goes, it is consistent with the view that a contraceptive method employed by the female partner is generally more acceptable where reliability does not complicate the issue; but this conclusion, though consistent with the data, is not a necessary inference from them. It might be added with equal justice that no general rule governing the preferences of individuals is sufficient to outweigh consideration of reliability. Concerning the actual reliability of the different methods, the accreditable data strongly reinforce the personal testimony in support of the reliability of the sheath. They do not reinforce personal testimony concerning the reliability of the cap. On the other hand, they do not conclusively demonstrate that personal testimony in favour of the reliability of the cap must be dismissed as erroneous. The correlation tables given in this chapter can be compared with one given later in Chapter XII.

CHAPTER VI

SOCIAL CLASSIFICATION OF THE MATERIAL

A table has already been given in Chapter I in which all the persons who replied to the questionnaires were placed in the eight Census groups. In the present chapter more detailed tables will be presented, but it will be necessary to regard any conclusions drawn with great caution on account of the smallness in size of all groups except Group I. In Table XXVIII are given the frequencies with which each method occurs in the different social groups. For example, the table shows that 79 per cent. of all recorded cases of the use of the sheath occur in Group I, 10 per cent. in Group II, and so on. These figures should be compared with those at the bottom of the table which show the relative sizes of the various groups.

It will be seen from Table XXVIII that of the two most widely used methods, the sheath is more popular in Group I, while coitus interruptus occurs with relatively greater frequency in Groups II, IV and VII. Two varieties of double methods, sheath or quinine with another method, have a high frequency in Group I. The newer chemical methods occur only in Groups I, II, III, and abstinence is only practised in Groups I and II.

In Table XXIX preferred methods are considered. These include both sole and best methods. The numbers of cases are given and also the percentage in which each method is preferred in the different groups. For example, 27·9 per cent. of the individuals in Group I prefer the sheath, while 15·4 per cent. prefer coitus interruptus.

This table indicates that the sheath is the preferred method in Groups I, II and III. In Groups IV and VII this position is occupied by coitus interruptus and in Group V by the rubber cap. The latter circumstance, in so far as such a small number of cases is of any value, would appear to point to the influence of birth-control clinics in this group. It is interesting to note that in Group VII, which is composed of miners, coitus interruptus is the method preferred by all the individuals practising contraception in this group. In both of the preceding tables the smallness of all the groups except Group I makes it unlikely that any one of the less well-known methods would occur in such a sample, hence no conclusions can be drawn as to their occurrence in the total population in these groups.

TABLE XXVIII

PERCENTAGE OCCURRENCE OF CONTRACEPTIVE METHODS IN DIFFERENT SOCIAL GROUPS

| Group | Method | I | | II | | III | | IV | | V | | VI | | VII | | VIII | |
|--------------------------------------|--------|------|------|------|-----|------|------|------|------|------|------|-----|---|------|------|------|-----|
| | | % | σ | % | σ | % | σ | % | σ | % | σ | % | σ | % | σ | % | σ |
| Sheath | .. | 79.3 | 2.7 | 10.0 | 2.0 | 5.4 | 1.5 | 2.7 | 1.1 | 2.3 | 0.9 | 0 | — | 0.5 | 0.5 | 0 | — |
| Sheath and another method | .. | 82.5 | 2.7 | 14.0 | 2.5 | 1.8 | 1 | 1.8 | 1 | 0 | — | 0 | — | — | — | 0 | — |
| Coitus interruptus .. | .. | 67.5 | 6.1 | 13.7 | 4.6 | 6.1 | 3.1 | 7.1 | 3.3 | 2 | 1.9 | 0 | — | 3.6 | 2.6 | 0 | — |
| C.I. and another method | .. | 73.3 | 11.2 | 6.7 | 6.6 | 0 | — | 20.0 | 10.3 | 0 | — | 0 | — | 0 | — | 0 | — |
| Rubber cap | .. | 76.5 | 3 | 11.2 | 2.2 | 5.6 | 1.7 | 5.1 | 1.6 | 1.5 | 1 | 0 | — | 0 | — | 0 | — |
| Quinine | .. | 73.3 | 4 | 11.7 | 3 | 8.3 | 2.4 | 5 | 2 | 0.8 | 2.5 | 0.8 | — | 0.8 | 0.8 | 0 | — |
| Quinine and another method | .. | 80 | 8 | 14 | 6.5 | 8 | 5.4 | 0 | — | 0 | — | 0 | — | 0 | — | 0 | — |
| Other chemical methods | .. | 87 | 8.1 | 7 | 6.2 | 7 | 6.2 | 0 | — | 0 | — | 0 | — | 0 | — | 0 | — |
| Syringing | .. | 63.2 | 7.8 | 13.2 | 5.5 | 10.5 | 2.8 | 7.9 | 4.4 | 5.3 | 2.3 | 0 | — | 0 | — | 0 | — |
| Safe period | .. | 78.1 | 7.3 | 9.4 | 3.6 | 6.3 | 3 | 6.3 | 3 | 0 | — | 0 | — | 0 | — | 0 | — |
| Sponge | .. | 81.8 | — | 0 | — | 9.1 | — | 0 | — | 9.1 | — | 0 | — | 0 | — | 0 | — |
| Abstinence | .. | 87.5 | 8.4 | 12.5 | 8.3 | 0 | — | 0 | — | 0 | — | 0 | — | 0 | — | 0 | — |
| All cases employing contraception .. | .. | 73.1 | 2.2 | 11.9 | 1.7 | 6.1 | 1.2 | 5.5 | 1.2 | 1.7 | 0.7 | 0 | — | 1.7 | 0.7 | 0 | — |
| No contraception .. | .. | 16.7 | 10.8 | 8.3 | 7.8 | 16.7 | 10.8 | 0 | — | 33.3 | 13.6 | 0 | — | 16.7 | 10.8 | 8.3 | 7.8 |

TABLE XXIX
PREFERRED METHODS IN DIFFERENT SOCIAL GROUPS

| Group | Method | I | | | II | | | III | | | IV | | | V | | | VII | | | Total |
|-------|----------------------------------|-----------------|------|-----|-----------------|------|-----|-----------------|------|-----|-----------------|------|-----|-----------------|------|---|-----------------|-----|---|-------|
| | | Number of Cases | % | σ | Number of Cases | % | σ | Number of Cases | % | σ | Number of Cases | % | σ | Number of Cases | % | σ | Number of Cases | % | σ | |
| | Sheath | 83 | 27.9 | 2.7 | 12 | 26.1 | 6.5 | 7 | 29.2 | 9.5 | 2 | 9.5 | 6.6 | 2 | 28.6 | — | 0 | 0 | — | 106 |
| | Sheath and another method | 23 | 7.7 | 1.6 | 4 | 8.7 | 4.2 | 0 | 0 | — | 1 | 4.8 | 4.8 | 0 | 0 | — | 0 | 0 | — | 28 |
| | Coitus interruptus .. | 46 | 15.4 | 2.1 | 10 | 21.7 | 6.1 | 4 | 16.7 | 7.7 | 6 | 28.5 | 9.8 | 1 | 14.3 | — | 7 | 100 | — | 74 |
| | C.I. and another method | 6 | 2.0 | 0.8 | 1 | 2.2 | 2.1 | 0 | 0 | — | 1 | 4.8 | 4.8 | 0 | 0 | — | 0 | 0 | — | 8 |
| | Rubber cap | 83 | 27.9 | 2.7 | 7 | 15.2 | 5.3 | 5 | 20.8 | 8.8 | 5 | 23.8 | 9.3 | 3 | 42.9 | — | 0 | 0 | — | 103 |
| | Quinine | 30 | 10.1 | 1.7 | 6 | 13.0 | 4.9 | 3 | 12.5 | 6.6 | 4 | 19.1 | 8.5 | 1 | 14.3 | — | 0 | 0 | — | 44 |
| | Quinine and another method | 8 | 2.7 | 1 | 1 | 2.2 | 2.1 | 1 | 4.2 | 4 | 0 | 0 | — | 0 | 0 | — | 0 | 0 | — | 10 |
| | Other chemical methods | 4 | 1.3 | 0.6 | 1 | 2.2 | 2.1 | 1 | 4.2 | 4 | 0 | 0 | — | 0 | 0 | — | 0 | 0 | — | 6 |
| | Syringe | 1 | 0.3 | 0.3 | 2 | 4.3 | 2.8 | 1 | 4.2 | 4 | 1 | 4.8 | 4.8 | 0 | 0 | — | 0 | 0 | — | 5 |
| | Safe period | 6 | 2.0 | 0.8 | 1 | 2.2 | 2.1 | 1 | 4.2 | 4 | 1 | 4.8 | 4.8 | 0 | 0 | — | 0 | 0 | — | 9 |
| | Miscellaneous methods | 5 | 1.7 | 0.8 | 0 | 0 | — | 1 | 4.2 | 4 | 0 | 0 | — | 0 | 0 | — | 0 | 0 | — | 6 |
| | Abstinence | 3 | 1.0 | 0.6 | 1 | 2.2 | 2.1 | 0 | 0 | — | 0 | 0 | — | 0 | 0 | — | 0 | 0 | — | 4 |
| | Undetermined .. | 298 | | | 46 | | | 24 | | | 21 | | | 7 | | | 7 | | | 403 |
| | | 9 | | | 4 | | | 2 | | | 2 | | | 0 | | | 0 | | | 17 |
| | TOTAL .. | 307 | | | 50 | | | 26 | | | 23 | | | 7 | | | 7 | | | 420 |

In Table XXX are set out the mean number of pregnancies, the mean number of children born alive, and the mean number of living children for the different social groups. In previous tables no attention has been paid to the number of living children. Owing to the wide age distribution among the mothers, the deaths recorded are not merely deaths in infancy, but also deaths on war service and deaths possibly at even later periods in life. These data introduce a number of questions of great complexity which lie beyond the

TABLE XXX
SIZE OF FAMILY IN DIFFERENT SOCIAL GROUPS

SUCCESSFUL CONTRACEPTION

| GROUP | Number of Cases | Duration of Reproductive Life (Years) | | Pregnancies | | Born Alive | | Living Children | Percentage of Miscarriages and Still-births | |
|--|-----------------|---------------------------------------|----------|-------------|----------|------------|----------|-----------------|---|----------|
| | | Mean | σ | Mean | σ | Mean | σ | | Per Cent. | σ |
| I | 201 | 10.2 | 0.37 | 2.2 | 0.13 | 1.9 | 0.10 | 1.8 | 14 | 1.7 |
| II | 36 | 11.6 | 1.01 | 2.2 | 0.29 | 1.8 | 0.24 | 1.6 | 17 | 4.2 |
| III | 13 | 14.3 | 1.92 | 2.3 | 0.46 | 1.7 | 0.34 | 1.5 | 27 | 8.1 |
| IV | 13 | 12.2 | 1.18 | 2.2 | 0.17 | 2.2 | 0.15 | 2.1 | 3 | 3.2 |
| V | 3 | 11.7 | — | 2.0 | — | 1.7 | — | 1.4 | 17 | — |
| VII | 5 | 19.4 | — | 3.8 | — | 3.6 | — | 2.8 | 5 | — |
| Total | 271 | | | | | | | | | |
| Number of pregnancies: Range 0-9 Number born alive: Range 0-8 | | | | | | | | | | |

province of this investigation. Hence it was thought best to confine discussion to the number of pregnancies and the number of children born alive. The number of children alive at the time of completing the questionnaires are included in the foregoing table for the convenience of other investigators.

The data presented in Table XXX are further summarised in Table XXXI, where the percentage of individuals who did not find any contraceptive method a failure are shown for the different social groups. It will be seen that Groups III, IV and V are markedly less

successful in their use of contraceptive methods. This result follows to some extent from the popularity of the less reliable methods in this group, as was shown earlier.

In spite of the smallness in size of all the groups except Group I, the figures shown in Table XXX agree very well with the general results of studies in population. The most striking fact which emerges is that, when contraception is successfully practised, the size of the family is the same in all the social groups except VII. It must not,

TABLE XXX—*continued*

SIZE OF FAMILY IN DIFFERENT SOCIAL GROUPS

UNSUCCESSFUL CONTRACEPTION

| Number of Cases | Duration of Reproductive Life (Years) | | Pregnancies | | Born Alive | | Living Children | Percentage of Miscarriages and Still-births | | Total |
|-----------------|---------------------------------------|----------|-------------|----------|------------|----------|-----------------|---|----------|-------|
| | Mean | σ | Mean | σ | Mean | σ | | Per Cent. | σ | |
| 106 | 11.9 | 0.53 | 3.3 | 0.18 | 2.6 | 0.15 | 2.6 | 19 | 2.1 | 307 |
| 14 | 13 | 1.79 | 4.1 | 0.74 | 3.3 | 0.81 | 3.0 | 20 | 5.3 | 50 |
| 13 | 13.5 | 1.17 | 3.6 | 0.40 | 3.2 | 0.33 | 3.1 | 13 | 4.9 | 26 |
| 10 | 16 | — | 5 | — | 3.4 | — | 2.9 | 32 | — | 23 |
| 4 | 14.8 | — | 4.8 | — | 3.7 | — | 3.3 | 26 | — | 7 |
| 2 | 14.5 | — | 6.5 | — | 6.5 | — | 6.5 | 0 | — | 7 |
| 149 | | | | | | | | | | 420 |

Number of pregnancies: Range 1-12
Number born alive: Range 0-11

however, be forgotten that none of the groups represent only completed marriages. In all the tables in the present section, Group VII occupies an anomalous position. Group VII is composed of mining workers, and is classified separately in the Census on account of its high birth-rate. Stevenson (*loc. cit.*) gives the standardised birth-rate for the group in the 1911 Census as 5.17. The next highest rates are 4.7 for agricultural workers and 4.63 for unskilled labour generally. In the small group who replied to the questionnaires, a high birth-rate compared with other groups is still seen in spite of

the comparatively successful use of contraceptives. The age at marriage in this group is somewhat lower than the average for all

TABLE XXXI

PERCENTAGE OF INDIVIDUALS PRACTISING CONTRACEPTION SUCCESSFULLY IN DIFFERENT SOCIAL GROUPS

| I | II | III | IV | V | VII | All Groups |
|---------------------------|---------------------------|---------------------------|----------------------------|-----------------|-----------------|-----------------------------|
| Per Cent. 66 ± 2.7 | Per Cent. 72 ± 6.3 | Per Cent. 50 ± 9.8 | Per Cent. 57 ± 10.3 | Per Cent. 43 | Per Cent. 71 | Per Cent. 64.6 ± 2.3 |

the questionnaires. The mean age at marriage for all groups is 24 years, while in Group VII it is 21.7 years. Further, the duration of reproductive life covered by the questionnaires in Group VII is

TABLE XXXII

SIZE OF FAMILY IN DIFFERENT SOCIAL GROUPS

Probably Completed Marriages Only

| GROUP | Number of Cases | Duration of Reproductive Life (Years) | | Pregnancies | | Born Alive | |
|----------------------------|-----------------|---------------------------------------|----------|-------------|----------|------------|----------|
| | | Mean | σ | Mean | σ | Mean | σ |
| SUCCESSFUL CONTRACEPTION | | | | | | | |
| I | 62 | 14.7 | 0.56 | 3.3 | 0.26 | 2.8 | 0.22 |
| II | 12 | 17.2 | 0.78 | 2.8 | 0.56 | 2.6 | 0.49 |
| III | 6 | 19.8 | — | 2.7 | — | 2.2 | — |
| IV | 5 | 15 | — | 2.4 | — | 2.2 | — |
| V | 1 | 17 | — | 3.0 | — | 2.0 | — |
| VII | 5 | 19.4 | — | 3.8 | — | 3.6 | — |
| UNSUCCESSFUL CONTRACEPTION | | | | | | | |
| I | 34 | 15.7 | 0.58 | 3.8 | 0.28 | 3.1 | 0.28 |
| II | 5 | 20 | — | 6.4 | — | 5.2 | — |
| III | 4 | 17.8 | — | 3.8 | — | 3.3 | — |
| IV | 6 | 19.1 | — | 6.0 | — | 4.0 | — |
| V | 1 | 20 | — | 7.0 | — | 2.0 | — |
| VII | 1 | 18 | — | 11.0 | — | 11.0 | — |

much longer than in the other groups. The youngest women in the successful portion of this group are forty and forty-one years old

respectively. From internal evidence derived from the replies of these women further conceptions appear improbable. Hence all the marriages in Group VII (Successful Contraception) can be regarded as probably completed marriages. To facilitate comparison between the Groups, Table XXXII has been drawn up so as to include only probably completed marriages. Only hysterectomy or death can finally dispose of the possibility of reproduction, but by including only women of forty-two or over in the table it is possible to say that it approximates to a table of completed marriages sufficiently closely to be suggestive. It will be seen that Group VII still has the highest birth-rate, but the significance of the differences cannot be determined from such small groups.

As Group I accounts for three-quarters of the questionnaires, a few additional facts concerning the two main occupational divisions are given in Tables XXXIII and XXXIV.

The selected cases are chosen so as to make the duration of reproductive life comparable with that of Group I as a whole. The last line of figures is repeated from another table for purposes of comparison.

It will be seen that the two selected occupational groups do not differ to any significant extent from the average of Group I as a whole.

Sargent Florence, in his book on population,¹ gives a table in which he correlates the birth-rate of different occupational groups with the opportunities of individuals belonging to such groups for obtaining access to information concerning birth control to support the view that the recent decline in the European birth-rate is mainly, if not exclusively, determined by contraceptive practice. The system of arbitrary marks which he assigns to assess facilities for obtaining access to information concerning contraceptive methods is largely conjectural, and is not supported by these data. At the same time it must be admitted that the data contained in these questionnaires cannot be regarded as a random sample of the population. Hence conclusions drawn from them are not necessarily contradictory to those which Sargent Florence has advanced.

It is perhaps worth emphasising in this connection a fact, the significance of which has not been brought into clear perspective by writers on the history of birth control. Sargent Florence, like

¹ *Psyche Miniature Series*.

TABLE XXXIII
PERCENTAGE OF SUCCESSFUL USE OF CONTRACEPTION AND MEAN SIZE OF FAMILY IN TWO OCCUPATIONAL
SUB-GROUPS WITHIN GROUP I

| Total Number of Cases | Husband's Occupation | Successful Cases | Percentage Success | Mean Duration of Reproductive Period (Years) | Mean Number of Pregnancies, Successes | Mean Number of Children Born Alive |
|-----------------------|---|------------------|--------------------|--|---------------------------------------|------------------------------------|
| 48 | University teaching and scientific work (Selected cases) | 30 | 62.5 ± 8.9 | 8.4 ± 0.93 | 1.8 ± 0.3 | 1.4 ± 2.4 |
| | | 20 | — | 10.2 ± 0.92 | 2.31 ± 0.35 | 1.8 ± 0.16 |
| 35 | Medicine and Surgery (Selected cases) | 25 | 71.4 ± 9.1 | 8.8 ± 0.74 | 2.5 ± 0.50 | 2.1 ± 0.31 |
| | | 21 | — | 9.9 ± 0.73 | 2.9 ± 0.51 | 2.3 ± 0.34 |
| 307 | All Group I | 201 | 66 ± 2.7 | 10.2 ± 0.37 | 2.2 ± 0.31 | 1.9 ± 0.10 |

TABLE XXXIV
PREFERRED METHODS IN TWO OCCUPATIONAL SUB-GROUPS WITHIN GROUP I

| Method | A. University Teaching and Scientific Work | | | B. Medicine and Dentistry | | | All Group I | |
|------------------------------------|--|-----------|----------|---------------------------|-----------|----------|-------------|----------|
| | Number of Cases | Per Cent. | σ | Number of Cases | Per Cent. | σ | Per Cent. | σ |
| Sheath | 13 | 27.1 | 6.4 | 10 | 28.6 | 7.7 | 27.9 | 2.7 |
| Sheath and another method | 6 | 12.5 | 4.7 | 0 | 0 | — | 7.7 | 1.6 |
| Coitus interruptus | 6 | 12.5 | 4.7 | 6 | 14.3 | 5.8 | 15.4 | 2.1 |
| C.I. and another method | 0 | 0 | — | 1 | 2.9 | 2.8 | 2.0 | 0.8 |
| Rubber cap | 19 | 39.6 | 7.1 | 9 | 28.6 | 7.7 | 27.9 | 2.7 |
| Quinine | 4 | 8.3 | 3.9 | 6 | 14.3 | 5.8 | 10.1 | 1.7 |
| Quinine and another method | 0 | 0 | — | 1 | 2.9 | 2.8 | 2.7 | 1.0 |
| Syringe | 0 | 0 | — | 1 | 2.9 | 2.8 | 0.3 | 0.3 |
| Safe period | 0 | 0 | — | 1 | 2.9 | 2.8 | 2.0 | 0.8 |
| Total | 48 | | | 35 | | | | |

other sociological writers who emphasise the spread of contraceptive practice as the all-important factor in the decline of the birth-rate, tacitly assumes that opportunities for obtaining information concerning birth control go hand in hand with educational amenities in general. The fact is that birth-control propaganda from its earliest beginnings in this country has been closely associated with radical and socialist propaganda among the skilled workers. It is therefore difficult to see why there is any *prima facie* plausibility for the view that the middle classes as a whole, possibly excluding doctors and nurses, have had greater access to knowledge concerning the technique of contraception than the better-paid sections of the working-class during the entire period in which the decline of the birth-rate has occurred, and more especially during the period when differential fertility was most pronounced.

The tables given in the present chapter have been arranged to indicate any differences which may exist between the different Census groups. It was seen that the relatively more effective methods are more common in Groups I and II, while Group VII relies almost exclusively on coitus interruptus. Groups I, II and VII practise contraception more successfully than the other groups. Data given for the mean size of the family showed little difference between the groups when contraception was successfully practised, though when only probably completed marriages were taken into account, the mean size of family in Group VII was higher than in the other groups. The size of the groups was not large enough to determine whether the difference was statistically significant. Similar tables were given for two sub-groups in Group I, namely, university teaching and scientific work on the one hand, and medicine and dentistry on the other hand. These showed no very striking difference from the average of Group I as a whole.

CHAPTER VII

GENERAL EFFECT OF BIRTH CONTROL ON HEALTH AND HAPPINESS

The replies to Question 12 supply what is in some ways the most interesting and valuable information obtained from the questionnaires. Exact statistical treatment of information of this kind is not possible. However, it does merit careful examination. As a preliminary the replies have been classified into large groups in order to give some idea of the relative proportions in which the different types of replies occur. They have been classified primarily according to the view the writers took of the effects of birth control on health and happiness. As the groups are discussed in detail, other points of general interest will emerge. This section will be illustrated by several quotations from the questionnaires, which will give a vivid picture of the point of view of the writers.

Before discussing the views of those who have practised birth control, the replies from persons who have not practised contraception can be considered here. Of the twelve cases who had not practised birth control, six make no general comments. One writer states the opinion that "there should be birth control in the case of too many children". The family in this case (a miner's wife) consists of seven children all alive. Another writer with no personal experience of birth control supports further investigation. Four writers state that they have no knowledge of any contraceptive methods and ask for information.

For the purposes of the present discussion, the two cases where abstinence was the sole method used are omitted. The point of view expressed has already been described, and we are here concerned with the opinions of those who have personal experience of contraception. Of a similar nature is the reply of a woman who abandoned the use of the so-called "safe period". This was the only method used, and was abandoned because of bad effects on nerves and health, and also because more children were desired. Here the objection is clearly to even a limited amount of abstinence.

Seventy-eight of the remaining cases offer no remarks of a general nature. Either no reply is given to Question 12, or the writers discuss particular methods only. Included in this group are replies of several

individuals who refer to coitus interruptus only. These have also been discussed previously. It cannot be too clearly emphasized that in any general discussion of the effects of family limitation, the particular results of practising coitus interruptus should be eliminated. Whether the use of any particular contraceptive method is followed by good or bad results remains to be proved. The preceding analysis may have contributed something to the solution of the problem. Coitus interruptus, however, stands alone, in that a very considerable amount of evidence has accumulated to show that for many people the practice results in nervous disturbances. Coitus interruptus is very widely practised, and hence should be specifically eliminated from any general discussion, such as the present one, of the benefits and drawbacks resulting from attempts to control conception.

There remain 339 questionnaires in which remarks of a general nature occur with reference to the effects of birth control or its desirability. These can be divided into four main groups. Group I consists of women whose experience of contraception has been so unsatisfactory that it has led them to regard all contraception as undesirable. There are two cases in this group. Group II can be roughly described by saying that the women of whom it is composed regard birth control as a necessary evil. Their experience has been unsatisfactory, but they regard some form of contraception as inevitable. There are thirty-seven cases in this group. Groups III and IV include all the individuals whose experience of birth control has been satisfactory. In Group IV are placed all those women who state definitely either that birth control is essential to health and happiness in married life, or that it has added to their health and happiness. This group comprises 107 cases. There is no sharp line of demarcation between Groups III and IV, but the replies in Group III are of a somewhat vaguer nature. For example, some writers state that they are in favour of birth control, or that no ill-effects have been observed, or that they are well and happy. This group is made up of 193 cases. In both Groups III and IV many of the writers mention the disadvantages of existing methods and stress the need for an improved method. They regard the inconveniences of the methods used as unimportant compared with the benefits derived from their use. Out of the 339 women whose opinions can be ascertained, 300, i.e. 88.5 per cent., have found their experiences of contraception satisfactory. The types of replies are summarised in Table XXXV.

The different types will now be discussed in detail, with illustrative quotations. There are several replies which at first sight appear to be strongly opposed to birth control. Of such, those who were continuing the practice at the time of writing are placed in Group II. There remain two individuals who have given up birth control altogether. One writer, after trying coitus interruptus and the sheath for two years, says: "I dislike birth-control methods and think mutual abstinence preferable". She appears to regard birth control as permissible on health grounds. The record of this case included nine pregnancies and five children born alive. The woman con-

TABLE XXXV
TYPES OF CONTRACEPTIVE EXPERIENCE

| GROUP | Nature of Comment | Number | Per Cent. | Number | Per Cent. |
|-------|--|--------|-----------|--------|-----------|
| I | Unsatisfactory, contraception abandoned | 2 | 0.6 | | |
| II | Unsatisfactory, but contraception inevitable | 37 | 10.9 | | |
| | <i>Total of unsatisfactory experiences</i> | | | 39 | 11.5 |
| III | Satisfactory | 193 | 56.9 | | |
| IV | Satisfactory, essential to health and happiness | 107 | 31.7 | | |
| | <i>Total of satisfactory experiences</i> | | | 300 | 88.5 |
| | TOTAL number of replies .. | | | 339 | |

cerned appears to have desired a large family, and to have possessed an income sufficiently large to prevent any undue hardship resulting from unlimited reproduction. For women so fortunately situated any artificial method of limitation does not appear to be very necessary, though it might be possible that a wise spacing of children would have reduced the number of miscarriages. The second case, of a woman who had three pregnancies and one miscarriage, is somewhat different. The sheath was tried for twenty months, then coitus interruptus for a total period of four and a half years. The comment is: "Since we have abandoned all restrictions, the mutual satisfaction has been of great benefit to our health and happiness."

Group II, which is made up of birth-control experiences which were regarded as unsatisfactory, though the practice was continued, is not negligible in size. All the replies but one are very similar in type. The writers are obliged to limit their families for economic or health reasons, but find that all the methods tried cause nervous strain, and destroy spontaneity in sexual union. The following reply is typical:

"We find that the æsthetic factor in intercourse is very susceptible to the use of contraceptive method, and the four methods we know anything of all destroy the joy of intercourse for us."

Two writers consider that a really reliable chemical contraceptive, if one could be discovered, would solve all the difficulties. The one exceptional case is worth quoting as an illustration of moral conflicts which are probably not uncommon.

"I regard birth control in any form as immoral, irreligious, and highly dangerous; but when two people are honestly devoted to each other and desire to give full expression to that devotion, how can they do so without bringing more children into the world?"

The period over which contraception was practised in this case was eight years. The replies cited emphasise the need for further research into contraceptive method. The difficulties we have been discussing are largely psychological, and can only be met by improving the technique of as many different varieties of contraceptives as possible. Any tendency which may exist for clinics to advise one or two methods with reference only to the anatomical aspect of the question is to be deplored. Married women should have access to experts who would consider their problems from every angle, and who would give advice and instruction accordingly. Such advice, if given at an early stage, could probably remove some of the more fanciful objections to a particular contraceptive method, and would at the same time stimulate the search for methods appropriate to the more fundamental psychological differences.

The largest group consists of individuals who find birth control satisfactory on the whole, while excluding those who are more definitely eulogistic. The replies are very varied, and can best be illustrated by quoting a few typical examples.

(a) "Birth control has been used by us solely, we think, for economic reasons, for while we are reasonably comfortable, we have a very high

standard of living and sense of responsibility to the child. The wife also has a profession, and too frequent an interruption would have a serious effect on the joint exchequer. We want more family, however, and as soon as economic conditions allow we shall probably discard control methods. Our ideal of a family is three or four. Both being of an affectionate nature, we do not think we could be happy or comfortable without birth control of some sort."

(b) "My husband and I have both had splendid health. We have had forty-three years of real married happiness, and now at sixty-five and sixty-four years of age are in comfortable circumstances, and there is not a happier couple under the sun. We were able to give our children a secondary education, and they are both well."

(c) "I was not very strong when I got married. My father died of consumption and also my eldest sister, so I have tried my utmost to keep well myself. I have only one girl, and she is a fine specimen of health for a girl of twelve. I have been able to give her the best of food and a good education, and also physical and swimming training, which would not have been possible if we had had half a dozen. My husband and I have lived happily all our married lives."

(d) "Undoubtedly the happiest time is when one wants a child and thinks of nothing else. We now regard birth control as a tiresome economic necessity, owing to much reduced income. It has not affected our health in any way, nor happiness, as we are still friends and lovers."

Many replies briefly state "no ill-effects". The majority deal with economic reasons for adopting birth control, and especially mention the desire to provide adequately for a limited number of children. The relation of birth control to childless marriages may be discussed in this connection. Among all the 420 cases, there are thirty-five in which no pregnancies had occurred nor were in progress at the time of writing. Seven of the writers express their intention of having children later. Four were unable to become pregnant though they wished to do so. As will be seen in the section on sterility, two of these cases had abandoned contraceptives over a considerable period. Eleven of the marriages had taken place since 1927. There remain thirteen voluntarily and apparently permanently childless marriages. In two of these, special reasons other than economic are given. In the present data, the percentage of voluntarily childless marriages, where no medical reason for the situation is given, is thus 2.6.

More than one writer mentions the great benefits accruing to the children produced, if a reasonable interval comes between births. One such reply is as follows:

"I am sure that certain spaces of time between each child is essential to the well-being of children. I give the dates of my children's births: A. *Healthy*. B. One year and four months later. *Healthy*. C. One year and three months later. *Delicate*. D. One year later. *Delicate*. E. Six and a half years later. *Very healthy*. The last child after I had used birth-control methods for seven years was, and is, a remarkably fine specimen."

The exact dates are given in the questionnaire, but are not reproduced in order to avoid embarrassment to the writer by a chance identification. One case of this kind of course proves nothing, but statistics are available in support of her contention.

Dr. Woodbury in a report entitled "Causal Factors in Infant Mortality" states his conclusions based on an investigation of 23,000 cases in the following words: "The mortality rate was highest for infants born at short intervals after preceding births—the short interval representing a difference of only one year in their mothers' ages, measured in even years, at the successive births—and lowest for infants who followed preceding births at intervals of four years or more, as thus measured. This difference could not be explained by age of mother, order of birth, or economic factors, and was apparently due to factors probably relating to the physical condition of the mother that were associated with the interval." The same point is emphasised in the Census reports for 1911, where a significant rise in infant mortality was observed when the interval between successive births was less than two and a half years.

Next in importance to the foregoing come health reasons. Operations or difficult confinements make it advisable to postpone pregnancy or avoid it altogether. There are many other medical reasons for contraception. These have been extensively discussed in the literature. Some of those who replied to the questionnaire stress the undesirability of having children while the parents are temporarily without a home of their own or are resident in a tropical climate. The bad effects on health and happiness of abstinence as an alternative to contraception are frequently mentioned.

Group IV consists of replies which are very similar in tone to those in the previous group, but are expressed with rather more emphasis. The most frequent comment is "birth control essential to health and happiness".

The point usually emphasised is that absence of fear and worry over unwanted pregnancies makes an enjoyable sexual life possible,

and so adds greatly to the health and happiness of both partners. Here are a few typical replies:

(a) "It makes the whole difference to the health and happiness of married life. Does away with all 'fear' of the husband. Uplifts motherhood to willing and sacred conception, guards and improves the health of the mother, as it prevents children being born in too quick a succession, and saves the birth of weakly children so often due to the unfit state of the mother."

(b) "We consider birth control has had a definite contribution to make to our married happiness (which is deep); we have had children when we wanted them, and not haphazard, and as we lead a life of constant short but long-distant separation, we consider our sexual delight in each other a definite factor in keeping us faithful to each other."

(c) "It has added greatly to our happiness and peace of mind. The whole affair is so easy and comfortable that it sinks into the background of life instead of obtruding, and takes its place with many interests and pleasures."

(d) "We both agree that the differentiation to which birth control leads between intercourse for mutual happiness and intercourse for the further end of having children increases a sense of responsibility and has made the birth of both children happier events than they would otherwise have been."

There are certain periods in married life which require special consideration. Opinions differ concerning whether contraception should be employed during the first year of marriage. Some think any artificial interference with sexual life at this period is undesirable, while others consider that mutual adjustments can be more satisfactorily accomplished if pregnancy is postponed for a time. During the menopause contraception is considered to be beneficial, since irregularity of menstruation adds to the anxiety about pregnancy at an already difficult time.

The foregoing quotations and remarks must suffice to convey a general impression of birth-control experiences among the women concerned. Each type of experience has been emphasised as far as possible in proportion to the frequency with which it occurred. The data presented may be summarised briefly as follows. A small percentage of the women who replied and who had practised birth control find all the methods known to them so distasteful as to constitute a serious impediment to a happy married life. In two cases these difficulties have led to birth control being abandoned altogether. More often in such cases it is continued and is accompanied by nervous strain and unhappiness. A very large percentage of these women who replied to the questionnaire find birth control satis-

factory. They regard it as essential to happiness in marriage to be able to combine normal sexual relations with adequate care for the health of the mother and the welfare of the children. Many of these women describe the happiness they have achieved in marriage and the pleasure they derive from having children, and consider the practice of birth control as the chief factor in attaining these ends. It must be emphasised that the contents of this chapter describe the replies received to Question 12 in the questionnaire. The opinion of this selected group of women does not necessarily warrant any conclusion being drawn as to the state of opinion in the population as a whole.

CHAPTER VIII

RELATION OF CONTRACEPTION TO FERTILITY

The Effect of Contraceptive Methods on Sterility.—Assertions have been frequently made to the effect that the use of contraceptive methods leads to inability to become pregnant. In a report by the Medical Committee of the National Council of Public Morals called *Medical Aspects of Contraception*, one of the medical witnesses, Dr. Gibbons, states, "there can be no doubt about the action of all contraceptives in the production occasionally of sterility". This remark is based on personal observation and embodies a type of fallacy which vitiates much current discussion on contraception. Both protagonists and opponents of birth control fall into the error of assuming that in the absence of artificial limitation conception inevitably follows sexual intercourse. There are no means of ascertaining what the natural fertility of the population at the present moment would be in the absence of birth control of some kind or another.

The widespread use of contraceptive methods in this country is thought by Carr-Saunders, Beveridge and others to have received a powerful impetus from the Bradlaugh trial in 1877; but, as Stopes and others have shown, contraceptives were known and widely used long before this date. Moreover, as Hogben has emphasised, there is reason to believe that there may have been factors in operation during the last half century tending to reduce the frequency of sexual intercourse and the possibility of conception. The crude birth-rate for all classes of occupied persons whose marriages commenced in 1851-61 is given as 7·28 children per family (Stevenson, "Fertility of Various Classes," *Journal of the Royal Statistical Society*, Vol. LXXXIII, 1920). Assuming that the unrestricted birth-rate would be somewhat of this order of magnitude, it is clear that as families of twelve or more children are not uncommon, families of 0, 1, 2, 3, etc., children would occur in a population even if no contraceptive methods were used. Hence, isolated cases of women having had 0, 1, or 2 children, and being unable to have any more after birth-control methods had been practised, prove nothing whatever.

Some relevant data are contained in the questionnaires which are

the subject of this enquiry. In the group of twelve cases where no birth control was practised there are no childless families. One individual had one pregnancy; three individuals had two pregnancies; and the number of pregnancies for the remaining individuals range up to eleven. In one case, after two children were born, no further pregnancy occurred over a period of sixteen years, although children were desired.

Among the remaining 420 cases, there occur seventeen cases of individuals who desired pregnancy but did not become pregnant. Five of these individuals gave up contraception for a few months only, leaving twelve cases requiring further consideration. Among these twelve, five were cases in which the period which elapsed after contraceptive practices were abandoned was two years or less. These are clearly inconclusive. There remain seven cases of apparently permanent sterility over a number of years. These can be tabulated as follows:

TABLE XXXVI

| | Method Abandoned | Age when Abandoned | Previous Family |
|---|--------------------------|--------------------|---------------------------|
| 1 | Coitus interruptus | 24 | 1 child, 1 miscarriage |
| 2 | Coitus interruptus | 30 | 1 child, 1 miscarriage |
| 3 | Rubber cap and syringing | 31 (?) | 1 child |
| 4 | Quinine | 36 | 1 child |
| 5 | Syringing (Iysol) | 35 | 3 children, 1 miscarriage |
| 6 | C.I. or rubber cap | 27 | No children |
| 7 | Quinine or sheath or cap | 26 | No children |

The foregoing data do not provide any evidence to indicate that permanent sterility is more common among individuals who have practised contraception than among those who have not. The problem can be approached in another way. The number of childless marriages can be compared with the number which would be expected in a random sample of the population. According to Lewis (*Natality and Fecundity*) about one-sixth, or 16.5 per cent. of all marriages are sterile. Only about 1 per cent. of women who have not borne a child during the first five years of marriage do so afterwards. There is no reason to believe that the percentage of sterile marriages has changed appreciably since the work of Lewis was done (News-

holme and Stevenson, *J.R.S.S.*, Vol. LXIX). Among these 420 persons who used contraceptive methods there were 55 whose marriages had lasted less than 5 years. Excluding these, we would expect to find among the remaining 365 16.5 per cent., or 60 marriages which had produced no living children. Actually we find 19, or 5 per cent. sterile marriages. Our sample is probably selected as regards the absence of sterility, so that no positive conclusions can be drawn from the above result. On the other hand, the figures obtained do not suggest that the use of contraception tends to produce sterility.

There remains the possibility that contraceptive methods might have the effect of causing temporary sterility, so that pregnancy is delayed. The relevant data are summarised in Table XXXVII. The figures for quinine suggest some such effect. Under the heading "quinine" are collected all the cases in which quinine was used alone or in combination with another method in order to get a sufficiently large group of data. Quinine does not occur elsewhere in the table, but some of the entries under the heading "rubber cap" may have involved its use, though the fact is not mentioned. The entry "immediately" includes all the cases in which the writer of the questionnaire stated that pregnancy occurred "immediately", "at once", or at the first intercourse without contraceptives.

It will be seen that with the use of the sheath and coitus interruptus the figures diminish fairly regularly. A large proportion of pregnancies occurred immediately, and the percentage at the other periods drops rapidly and steadily. No standard exists with which to compare these figures, but they certainly do not suggest any retarding effect on conception. In the case of quinine and the rubber cap, there is a smaller proportion of immediate pregnancies and a larger proportion in the period 1-3 months. In the case of quinine there is also a considerably larger proportion of much delayed pregnancies. Judged by the usual standards of statistical significance, these differences appear to be significant, but there are obviously many sources of error. Where pregnancies which occurred some time ago are concerned, the writers' memories may be at fault, and they may have described a pregnancy as immediate when it really occurred in the second time-interval. This fact probably explains the greater proportion in the second time-interval in the rubber-cap group, where there are many recent pregnancies. Further, it has been shown that quinine is an extremely unreliable contraceptive. The fact that

TABLE XXXVII
DURATION OF PERIOD BETWEEN ABANDONMENT OF CONTRACEPTION AND ENSUING PREGNANCY

| Length of Time before Pregnancy Ensued | Sheath | Per Cent. | Coitus Interruptus | Per Cent. | Rubber Cap without Quinine | Per Cent. | Quinine | Per Cent. |
|--|--------|------------|--------------------|------------|----------------------------|------------|---------|-------------|
| Immediately .. | 65 | 62.5 ± 4.7 | 56 | 86.2 ± 4.3 | 19 | 52.8 ± 8.3 | 53 | 46.1 ± 4.6 |
| 1 month-3 months .. | 21 | 20.2 ± 3.9 | 6 | 9.2 ± 3.6 | 15 | 41.6 ± 8.2 | 33 | 28.7 ± 4.2 |
| 3½ months-5 months .. | 10 | 9.6 ± 2.6 | 3 | 4.6 ± 2.7 | 0 | 0 | 16 | 13.9 ± 3.2 |
| 6½ months-9 months .. | 3 | 2.9 ± 1.7 | 0 | 0 | 1 | 2.8 ± 2.8 | 1 | 0.87 ± 0.28 |
| 9½ months-1 year .. | 4 | 3.8 ± 1.9 | 3 | 4.6 ± 2.7 | 0 | 0 | 5 | 4.3 ± 1.8 |
| Over 1 year-2 years .. | 0 | 0 | 2 | 3.1 ± 2.1 | 1 | 2.8 ± 2.8 | 2 | 1.7 ± 1.3 |
| Over 2 years .. | 1 | 1.0 ± 0.31 | 1 | 1.5 ± 1.2 | 0 | 0 | 5 | 4.3 ± 1.8 |
| | 104 | | 65 | | 36 | | 115 | |

quinine has been used as a contraceptive with apparent success indicates that the women concerned were not of the type who would conceive readily.

Two considerations can be adduced to show that this is the most probable explanation. If quinine had any general effect on sterility, it would be a far more reliable contraceptive than it actually is. If any such effect exists it must be extremely limited, since such a large number of accidental conceptions occur while quinine is being used as a contraceptive.

Attention may also be drawn to the connection between quinine and miscarriages, which is discussed in another place. It is there shown that a phenomenon which on superficial examination appears to be a result of a contraceptive method antedates it in time. Many

TABLE XXXVIII

| Method | Number of Cases | Percentages of Miscarriages and Still-births |
|--------------------------|-----------------|--|
| No method | 12 | 11.1 ± 9 |
| Coitus interruptus | 36 | 10.4 ± 5 |
| Sheath | 30 | 19.0 ± 7 |
| Quinine | 14 | 28.9 ± 12 |
| Rubber cap | 19 | 10.0 ± 6.9 |
| Successful | 271 | 13.6 ± 2.0 |
| Unsuccessful | 149 | 21.6 ± 3.4 |

correlations of a subtle and obscure nature exist between the use of particular contraceptive methods on the one hand and the physiology and psychology of the persons using them on the other. Hence any notion of causality should not be introduced without very careful scrutiny.

Miscarriages and Still-births.—Owing to a variety of methods having been used by most of the writers of the questionnaires, it is difficult to present any large body of data concerning any possible effect of contraceptive methods on the number of miscarriages. In Table XXXVIII are given the percentages of miscarriages and still-births to total pregnancies in cases where either no method or one method alone was used. The percentages for the groups of all successful and unsuccessful cases are also given.

Leaving aside the case of quinine, which will be discussed in detail, the highest and lowest percentages are 21·6 per cent. for all unsuccessful cases and 10 per cent. for the rubber-cap method. As far as the smaller groups are concerned, the difference between the percentages cannot be shown to be statistically significant on account of the large errors involved. The difference between the successful and unsuccessful groups is 8 per cent. $\pm 3\cdot9$. The significance of this difference will be further discussed. The high percentage of miscarriages and still-births occurring where quinine was the sole method used would appear at first sight to be significant. When the cases are examined in detail, this is seen to be a mistaken view. Among the fourteen persons who used quinine alone there occurred eleven miscarriages, eight of which occurred before any quinine was used at all, and three after its use. Of the five still-births, two were due to a contracted pelvis. Two of the remaining three occurred before the use of quinine and one after. Clearly the high percentage in this group is due to causes operating before any contraceptive method was used. These facts are a very valuable indication of the danger of drawing any conclusions from statistics concerning contraception without the most rigorous examination.

There is considerable controversy as to the effect of quinine on the female reproductive system. Taken by the mouth, it is popularly regarded as an abortifacient, but a recent medical authority states that it is very difficult, if not impossible, to induce labour by means of quinine before full term (Theobald, *Proc. Roy. Soc. Med.*, Vol. XXIII, 1930). The paper quoted is concerned with the effect of quinine taken by malarial patients upon conception and pregnancy. In it the statement is made that "there is no evidence to prove that quinine taken by mouth affects conception". The writer also states that it is extremely unlikely that quinine taken by mouth can cause abortions or miscarriages or in any way affect the fœtus. It does not follow at all that the effects of quinine taken by mouth would be necessarily the same as the effects of quinine when absorbed through the vaginal mucous membrane. But as far as clinical experience of the use of quinine pessaries is concerned, it does not appear to strengthen the suspicion of bad results following from the use of the quinine pessary.

Previous tables have disclosed the fact that the percentage of miscarriages and still-births is significantly higher for those who practised birth control unsuccessfully than for the successful group.

This is true for the Census Group I and for the questionnaires taken as a whole. A possible significance for this difference is not difficult to surmise. Those who are classified as successful are individuals who stated that they only conceived deliberately. It may therefore be presumed that few would take any steps calculated to terminate pregnancy. Of the unsuccessful group it is not safe to presume this. On the contrary, since the group includes individuals who became pregnant reluctantly, it is more likely that it would be found to contain individuals who had at some time had recourse to violent exercise, the use of purgatives and other means supposed or actually liable to induce miscarriage.

Further light can be obtained concerning the truth of this supposition. If it is correct, the proportion of miscarriages associated with pregnancies ensuing through defective contraceptive technique must be higher than the proportion of miscarriages resulting from deliberate conception. If therefore no significant difference is observed, we may dismiss this interpretation. While an insignificant difference would prove the suggestion given above to be false, a significant difference would not certainly prove that it is true, unless we assume that all the pregnancies in the successful group were actually due to giving up contraceptive practice. In fact, it is legitimate to surmise that in making statements of this kind some of the writers may have been wise after the event, so that the successful group may have contained an appreciable proportion of individuals who, if questioned immediately before they became pregnant, would have denied their intention of conceiving. Ill-health is certainly a reason conducive to the desire to avoid pregnancy, and at the same time a contributory factor to miscarriage if a contraceptive method has failed. Thus the same individual who, if in good health and therefore less likely to have a miscarriage, might state that a conception was deliberate, if unwell, and therefore more likely to have a miscarriage, would be more disposed to attribute conception to failure of the contraceptive method employed.

The relevant statements in the questionnaire bearing upon the considerations advanced in the preceding paragraphs are as follows: In the successful group three out of seventy-eight miscarriages were stated to be abortions. Of these one was carried out under medical advice. Confining ourselves to those individuals who had at least one miscarriage in the unsuccessful group, there are 164 live births recorded. Of these 35 (or 21·3 per cent.) are stated to be due to failure

of the contraceptive method employed; 44 (or 26·8 per cent.) were apparently intentional. Of the remaining 85 (or 51·8 per cent.), the statements made are ambiguous. In the unsuccessful group there are 17 abortions out of a total of 100 miscarriages; 33 miscarriages (or 33 per cent.) are stated to have been due to failure of the method used; only 12 (or 12 per cent.) were apparently associated with deliberate conception; and 38 (or 38 per cent.) must be classified as doubtful from this standpoint.

The proportion of explicit abortions to total pregnancies is higher in the unsuccessful group. The difference between the percentages is $2\cdot68 \pm 0\cdot73$. As this difference is more than four times its standard deviation, it is clearly significant. The most striking circumstance divulged by these figures is the much higher proportion of miscarriages as compared with live births resulting from failure of the contraceptive method employed in the unsuccessful group. This lends support to the presumption that the higher percentage of miscarriages in the total number of pregnancies of the unsuccessful group as compared with the successful group may be due to the fact that an appreciable proportion of miscarriages in the former group were precipitated by devices employed to terminate pregnancy or alternatively that the mother is less disposed or less able to exercise adequate precautions to ensure the survival of the foetus when conception is unwelcome. At the same time it is not legitimate to exclude the possibility that the successful group contains records of pregnancies which would have been attributed to failure of the contraceptive method in use if the mother had been unwell and therefore possibly more likely to have a miscarriage.

A somewhat perplexing feature is revealed in the next table in which the percentage of miscarriages and still-births is classified according to the total number of pregnancies for the Census Group I. In this group there is seen to be a steady increase of the *proportion* of miscarriages, etc., as the number of pregnancies becomes greater among individuals who practised contraception successfully. The sub-group classed as unsuccessful does not show any regular correspondence. There is a suggestive discrepancy between the successful and unsuccessful divisions in Census Group I. Table XXXIX shows that this discrepancy does not manifest itself when all the Census groups are taken together. With such small figures available the point seems hardly worthy of elaborate statistical treatment. A suggestion concerning its significance may be advanced tentatively. Assuming

TABLE XXXIX
PERCENTAGES OF MISCARRIAGES AND STILL-BIRTHS FOR VARYING NUMBERS OF PREGNANCIES (ALL GROUPS)

| Number of Pregnancies | SUCCESSFUL CONTRACEPTION | | | | UNSUCCESSFUL CONTRACEPTION | | | |
|-----------------------|--------------------------|---|------------|----------|----------------------------|---|------------|----------|
| | Number of Cases | Number of Miscarriages and Still-births | Percentage | σ | Number of Cases | Number of Miscarriages and Still-births | Percentage | σ |
| 1 | 54 | 2 | 3.7 | 2.7 | 12 | 3 | 25.0 | 12.5 |
| 2 | 85 | 13 | 7.7 | 2.1 | 38 | 9 | 11.8 | 3.7 |
| 3 | 53 | 27 | 16.9 | 3 | 38 | 15 | 13.2 | 3.1 |
| 4 | 15 | 14 | 23.3 | 5.4 | 28 | 22 | 19.6 | 3.7 |
| 5 | 14 | 13 | 18.6 | 4.7 | 11 | 8 | 14.6 | 4.8 |
| 6 | 7 | 8 | 19.0 | 1.9 | 9 | 16 | 29.6 | 6.2 |
| 7 | 5 | 11 | 31.4 | 7.8 | 5 | 19 | 54.3 | 8.4 |
| 8 | 0 | — | — | — | 1 | 0 | 0 | — |
| 9 | 2 | 5 | 27.8 | 10.6 | 4 | 8 | 22.2 | 6.9 |
| 10 | 0 | — | — | — | 0 | — | — | — |
| 11 | 0 | — | — | — | 2 | 5 | 22.2 | 8.8 |
| 12 | 0 | — | — | — | 1 | 6 | 50.0 | 14.4 |

TABLE XL
PERCENTAGE OF MISCARRIAGES AND STILL-BIRTHS FOR VARYING NUMBERS OF PREGNANCIES IN GROUP I

| Number of Pregnancies | SUCCESSFUL CONTRACEPTION | | | | UNSUCCESSFUL CONTRACEPTION | | | |
|-----------------------|--------------------------|---|------------|----------|----------------------------|---|------------|----------|
| | Number of Cases | Number of Miscarriages and Still-births | Percentage | σ | Number of Cases | Number of Miscarriages and Still-births | Percentage | α |
| 1 | 41 | 1 | 2.4 | 6.9 | 11 | 3 | 27.3 | 13.4 |
| 2 | 63 | 10 | 7.9 | 2.4 | 28 | 7 | 12.5 | 4.4 |
| 3 | 39 | 19 | 16.2 | 4.1 | 29 | 13 | 14.9 | 3.8 |
| 4 | 7 | 5 | 17.9 | 7.3 | 20 | 16 | 20.0 | 4.5 |
| 5 | 9 | 10 | 22.2 | 6.2 | 6 | 5 | 16.7 | 6.9 |
| 6 | 6 | 8 | 22.2 | 6.6 | 8 | 13 | 27.1 | 6.4 |
| 7 | 4 | 9 | 32.1 | 8.8 | 1 | 5 | 71.4 | — |
| 8 | 0 | — | — | — | 1 | 0 | 0 | — |
| 9 | 2 | 5 | 27.8 | 10.6 | 1 | 2 | 22.2 | — |
| 10 | — | — | — | — | 0 | — | — | — |
| 11 | — | — | — | — | 0 | — | — | — |
| 12 | — | — | — | — | 1 | 6 | 50.0 | 14.4 |

that the figures cited indicate that foetal viability diminishes with successive pregnancies more conspicuously for the successful than for the unsuccessful members of Group I, it is not unnatural to ask whether the initial chances of survival of the embryo at a stage when embryonic death would not be designated a miscarriage may not have been less in the successful than in the unsuccessful group. If so, individual physiological factors may have contributed significantly to apparent success or failure in contraceptive practice among individuals in Group I.

In the present chapter evidence has been brought to bear upon whether the practice of contraception has any effect in causing permanent sterility or in delaying pregnancy when one is desired. It has been shown that in the material available for the present analysis there is nothing to suggest that any such effect occurs. The higher percentage of miscarriages and still-births among those who were unsuccessful in their use of contraceptive methods was discussed. Certain of the facts adduced indicate the possibility that this higher percentage may have been due to more or less deliberate attempts to terminate pregnancy when conception had occurred as a result of the failure of a contraceptive method.

CHAPTER IX

THE SO-CALLED "SAFE PERIOD"

In connection with the practice of restricting intercourse to a definite portion of the menstrual cycle two questions arise. The first is, whether there is in fact a safe period. The second is whether such a safe period, if it exists, corresponds to what appears to have been so regarded by those who have replied to the question. The existence of a safe period is of profound sociological importance, the significance of which has not been fully recognised by statisticians who are disposed to interpret the recent decline of the birth-rate in European countries as exclusively due to the spread of contraceptive methods. If there actually exists a period in which conception cannot take place, changes in frequency of sexual intercourse involving no deliberate limitation of the family must be regarded as possibly contributory factors to a declining birth-rate.

From the biological standpoint, the existence of a safe period involves three suppositions. Each of these can be tested by experimental methods in the case of other mammals. None of them have been established by direct observation in the human species. The first supposition is that the duration of life of the sperm within the female body is short compared with the length of the menstrual cycle. The second is that the period of survival of the unfertilised ovum is short in comparison with the length of the menstrual cycle. The third is that the time at which ovulation occurs in the menstrual cycle varies within narrowly prescribed limits. Strictly speaking, only the first two suppositions are relevant to the possibility that small changes in the frequency of sexual intercourse might statistically affect the birth-rate. The third is only of importance in so far as reliance upon the existence of a safe period is individually employed as a contraceptive practice.

With regard to the duration of the period over which seminal fluid retains its fertilising power within the body of the female, it has been frequently stated in the past that human spermatozoa may survive for several weeks. This statement has till recently been current in many medical text-books. It rests solely upon anecdotal evidence of highly debatable value. It passed without criticism so long as there was no experimental evidence concerning the duration

of life of the sperm in related mammals. During the past five years very careful studies have been made by Hammond, Walton and Moore to determine the length of survival of spermatozoa in domestic mammals. The maximum period of survival within the body of the female of the same species in the rabbit, the guinea-pig, and the horse lies between twelve and twenty-four hours. It would not be legitimate to assume that these figures are representative of the survival of human spermatozoa within the human body. On the other hand, until there is direct experimental evidence bearing on the point, the earlier estimate varying from three to six weeks must be regarded as most improbable, or at least treated with the gravest suspicion. There is no direct evidence concerning the duration of life of the unfertilised human ovum. In mammalian species which have been studied from this point of view, a period of two to ten hours may be taken as representing the limit.

Although it has been asserted that the spermatozoa of the bat survive for some months, there are no observations pointing to the conclusion that the duration of life of the mammalian ovum is of an order of magnitude comparable with the length of the menstrual cycle. As far as human beings are concerned, there is no positive evidence pointing to the existence of a safe period. On the other hand, the most recent and critical work on the survival of spermatozoa and ova in other mammals provides strong presumptive evidence in favour of the affirmative view, until such time as evidence from other sources than anecdote has been brought forward to prove the contrary.

It is not yet certainly established that a safe period exists in the human species in the first sense defined above as bearing on the population problem. In the second sense, i.e. as a reliable method of deliberate contraception, the existence of a safe period not only implies that the duration of life of the sperm and the unfertilised egg is comparatively short, but also presupposes that the time of ovulation can be ascertained. In the past, partly owing to a false analogy between the menstrual cycle of primates (men and monkeys) and the oestrous ("heat") cycle of the lower mammals, it has been very commonly believed that ovulation occurs in the human species about the time of menstruation. If the first and second assumptions already discussed were established, this would imply that the middle of the month is the period in which conception is least likely to occur as the result of intercourse. The disposition to believe this may be

reinforced by a teleological supposition based on the evidence pointing to the conclusion that the middle of the month is the period of minimum excitability. The only thing that is reasonably certain about the problem we are now discussing is that the prevailing belief in the efficacy of restricting intercourse to the middle week or middle fortnight of the month as a means of avoiding conception is undoubtedly wrong.

The results of recent study point to two conclusions. One is that the time of ovulation varies within wide limits in the human species. The other is that the time at which ovulation is most likely to occur is from the seventh to the thirteenth day. The only point upon which profound disagreement exists concerns whether ovulation occurs before the seventh or after the thirteenth day sufficiently often to preclude the use of the safe period as a contraceptive practice of great reliability. In any case it is generally agreed that the seven days immediately preceding menstruation constitute a period during which the probability of conception is at a minimum.

The second conclusion stated in the last paragraph receives powerful confirmation from the recent work of Corner, Zuckerman and others on monkeys. Zuckerman states the salient facts in the following terms:

"All female Old World primates experience approximately four-weekly menstrual cycles. Many of them manifest cyclical changes, varying in degree, in the colour and form of the external pudendal organs and the skin adjacent to them, an area known as the 'sexual skin'. These changes are shown, for instance, by the Chimpanzee, Orang, *Cercopithecus talapoin*, all the species of the genus *Cerocebus*, most of the species of the genus *Macaca*, and all the species of the genera *Papio* and *Mandrillus*. The sexual skin becomes active immediately after the onset of menstruation, and reaches its maximum of activity before the middle of the cycle. Shortly after the middle of the cycle the sexual skin suddenly resumes its quiescent appearance, in which condition it remains until the onset of the next catamenia, when it again becomes active. . . . Ovulation in the monkey occurs about midway between the two menstrual periods. Monkeys, however, do not ovulate every cycle."

Three methods have been chiefly employed to ascertain the time of ovulation in human beings. The first relies on correlating microscopic changes in the uterus and the vaginal secretions or observations on the contractions of the uterus in human beings with characteristic histological or physiological events in the menstrual cycle of monkeys. In the latter the time of ovulation can be determined directly, and

is known to vary within very narrow limits. Evidence from this source has led to conflicting conclusions concerning the extent of variation in human beings, and its value is somewhat dubious for a reason disclosed in the last sentence cited from Dr. Zuckerman's paper. A second method is based upon personal enquiries into alleged cases of conception following isolated coitus. These are very carefully surveyed in a recent paper (1927) by Dr. Dickinson of New York, from whose paper the following quotation is taken:

"Reports from more than one hundred women are recorded where pregnancies followed single exposures or brief visits of the husband. These have been reviewed and charted by Zangemeister, Pryll and Siegel. The three lists are largely made up from the same material, and chiefly from Schlichting, Gossrau, Hecker and Ahlfeld. Siegel's first paper dealt with some three hundred and twenty women, but his first graph took one hundred and twenty-five as being above criticism, while his eight hundred included all the instances of single or limited coitus he could find in the literature. I have thought best to depict all three main studies, redrawn in Section D (Fig. 2), in order to show how little they vary in essentials. The Siegel line is much smoother than the other two near it, though constructed partly from the same records, and not exceeding the others enough in numbers to account for some rather marked differences. The height during menstruation should be noted.

"Pryll omits Siegel's cases from his chart, and gives graphs of seven of the eleven authors he draws upon. Four of these seven resemble the Zangemeister and Pryll lines in our graph and Siegel's chart of his hundred and twenty-five cases, in that there appears a secondary rise between the thirteenth and the eighteenth day, centering on the fifteenth, and thus not far from Henson's average of the fourteenth and Jaeger's rise, and the main group of embryo indications. This secondary wave of fruitful cohabitation comes close to the ovulation shown in Section C (Fig. 2). 'This group of cohabitation calls only from one to four days' life of sperm within the female passages, as against seven to thirteen days with the group represented by the earlier peaks. The striking thing in the C and D Sections (Fig. 2), and the chief puzzle in human reproduction thus graphically pictured for the first time, is the gap between the highest frequency of isolated coitus and of ovulation according to laparotomy evidence. The explanation that ovulation may be induced by orgasm we have suggested.

"Issmer, drawing his material from the München 'Frauenklinik,' reports on four hundred and seventy-two patients, giving both date of period and of conception. As pregnancies starting during the period he lists only 12 per cent., and for the pre-menstrual week 9.07 per cent. The first week takes 37.07, the second week 35.36, or 72.43 per cent. in the first half. Jaeger's pre-menstrual group comprises 10 per cent. of his hundred and ten patients, and the menstrual 13.3 per cent. Hensen (quoted in Zweifel) found in two hundred and forty-eight cases of known single coitus that 86 per cent. ran in the neighbourhood of the fourteenth day."

A third method available for ascertaining the time of ovulation in the human species depends upon the fact that the liberation of an ovum in the mammal is followed by the development of the glandular structure known as the corpus luteum which is formed from the

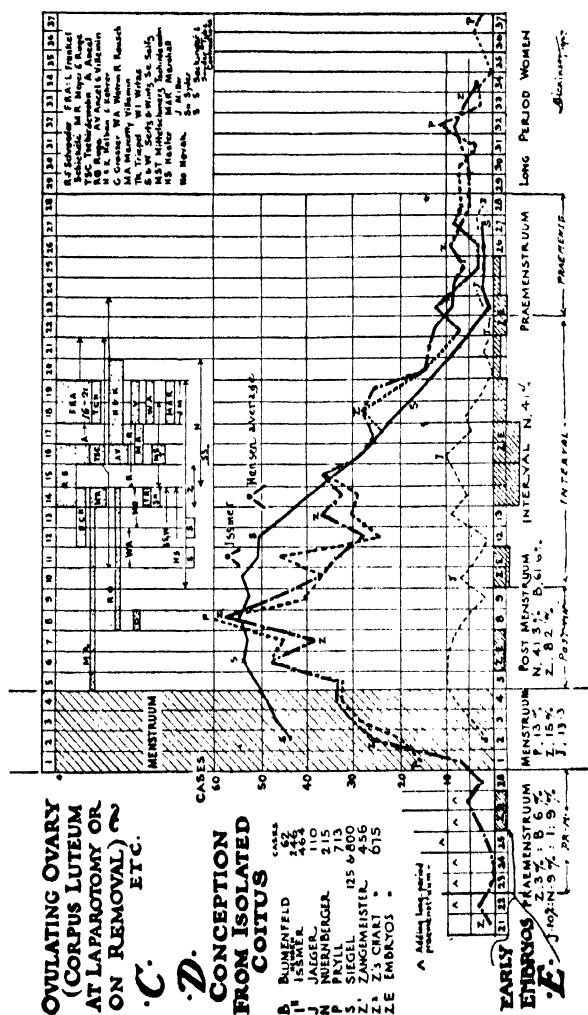


Fig. 2.—The Menstrual Cycle. C, The ovulating ovum. D, Conception from isolated coltus. E, Early embryos. Reproduced from "The 'Safe Period' as a Birth Control Measure," by Dr. R. L. Dickinson.

follicle of the ovum. Evans and Swezy (1931) in a recent paper discuss the observations which have been made on ovaries removed or examined during operative procedure. The evidence from this source does not permit us to draw any certain conclusions. As an

illustration of the neglect of research in the physiology of human reproduction, it may be pointed out in this connection that there exist both direct means and a variety of indirect methods for settling the limits of variation of the time of ovulation in the human subject. An enormous mass of data bearing directly on the issue could be collected in a very short time if a concerted effort were made to ascertain where possible the date of the last menstrual period in all cases of autopsies on the female subject. By pooling information from all the hospitals of this country sufficient material could be obtained in a few months. An indirect approach to the problem which demands more extensive application is a correlation of the biochemical changes of the menstrual cycle with changes in the composition of the blood at the time of ovulation in other animals.

If we accept the present presumptive evidence from the study of other animals to support the conclusion that the possibility of conception in any given individual is limited to a small fraction of the menstrual cycle, it is evident that changes in the frequency of sexual intercourse may exert a very appreciable statistical effect upon the birth-rate. It has been pointed out by Professor Lancelot Hogben that there are reasons for believing that changes in social hygiene such as have been introduced during the period of the declining birth-rate may have tended to diminish the frequency of sexual intercourse. The recognition that ovulation occurs most frequently in the post-menstrual fortnight increases the cogency of this contention. The statistical study by Katherine Bemont Davies shows a very striking minimum of sexual desire during the intermenstrual period. Maximum excitability occurs immediately before and after menstruation. Two new factors which would tend to promote greater frequency of sexual intercourse in what we may now assume to be the "safe" period, if indeed a safe period exists, have both come into operation during the period of the decline of the European birth-rate. One of these is the increasing disposition among married couples to adopt separate sleeping arrangements. The other is the birth of the feminist movement. In its initial stages feminism was identified with a revolt against the sexual demands of the male partner and a puritanical exaltation of abstinence. With the growth of a more enlightened attitude to sex, this has given place to a recognition of the sexual needs of both partners and the attempt to adjust them in such a way as to secure maximum satisfaction to both. It can hardly be doubted that this attitude, reinforced by the factor of additional

privacy which operates to-day in so many marriages, must reduce the frequency of sexual intercourse at the time when conception is most likely to occur, even if the net frequency of sexual intercourse remains unchanged.

The data presented in the questionnaires will now be considered in the light of the foregoing conclusions. It will be seen that the relevant cases are few. They are set out in Table XLI. Those classified under the heading "doubtful safety" cases are cases in which the "safe period" was regarded as some period from the fifteenth day onwards. In those classified as "unsafe", the "safe period" included what is probably the most fertile period.

The data included in the following table are of a very complicated nature. Where no dates are given it would be useless to draw any conclusions, except that the high proportion of failures in Class I confirms the view that the customary "safe period" is useless. There occur no examples of intercourse confined to periods that can be regarded as probably safe in the light of modern research. In Class I where dates are given they confirm the view stated earlier. The six definitely unsafe periods are all failures. The case called "doubtful intercourse" was restricted to a period from the fifteenth to the twenty-third day, and was successful for nine years.

In Class II there was one success while using an unsafe period. In this case the method was used for about twenty years continuously, and consisted in abstaining for the first ten days of the month and for the rest of the time apparently sponge, quinine pessary, and syringe were used simultaneously. This case evidently has no bearing on the "safe period", but is a tribute to the efficacy of the triple method chosen.

Classes III and IV are complicated by the use of other contraceptives. In one case in Class III no contraceptive method was used during the "middle period" for fourteen years successfully, coitus interruptus being used at other times. No explanation can be offered of this case, except possibly (*a*) natural sterility supervening, or (*b*) very infrequent coitus. The previous history of this case appeared to be marriage at twenty-five, followed by a period of four years during which no contraceptive was used. One child was born alive and there was one miscarriage. There are two successes in this class, using a doubtful period. "A" used no contraceptive from the sixteenth day to the twenty-third day, and coitus interruptus at other times for two years. "B" used no contraceptive from the fifteenth to

TABLE XLI
 SUCCESSES AND FAILURES WITH THE USE OF THE SO-CALLED "SAFE PERIOD"

| Meth d | Physiological Safety of Period | Failure | Successful Under One Year | Successful Over One Year |
|---|---|--------------|---------------------------|--------------------------|
| Class I. Intercourse in safe period only; no other contraceptive | No dates given Unsafe Doubtful safety | 11 6 0 | 1 0 0 | 3 0 1 |
| Class II. Intercourse in safe period only, with quinine | No dates Unsafe | 1 0 | 1 0 | 0 1 |
| Class III. No contraceptive in safe period; contraceptive used outside period | No dates Unsafe Doubtful safety | 0 0 0 | 1 0 0 | 1 1 2 |
| Class IV. Contraceptive "a" in safe period; contraceptive "b" outside safe period | No dates Unsafe | 0 1 | 1 0 | 1 0 |

the twenty-third day, and syringed with water at other times for twenty-five years. As far as the data concerning the use of a "safe period" can be analysed, they seem to indicate that conception does not usually take place after the fifteenth day. On the other hand, it must be recorded that in one case where no dates are given for the "safe period", the writer states that conception occurred once "on the third day before a period", and a second time on the tenth day after a period. One case might be added from the questionnaire filled in by husbands. Over a period of nine years no sexual intercourse took place for twelve days after the end of menstruation, when the practice was given up and pregnancy ensued within a month.

From the practical point of view, the true "safe period" should be regarded as a question urgently needing further research, rather than as a contraceptive method to be recommended for use at the present time. Experimental use of a "safe period", on the lines indicated on chemical contraceptives, would be of great value. Some of those who have tried the popular "safe period" found it impossible to confine their intercourse to set periods of the month. This difficulty might be minimised to some extent if what now appears to be the true "safe period" were tried. Unlike the inter-menstrual period, it coincides with the periods of maximum excitability in the female, i.e. immediately before and after menstruation.

Existing knowledge concerning the most probable period for conception could be made of practical value in the case of virgins. It is generally believed that the difficulties and risks of conception are increased at the period when sexual life commences in the female. If, when the need for the prevention of conception is very urgent, the first intercourse were arranged to take place a week before menstruation, the chance of failure of any contraceptive method employed would be very greatly diminished.

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CHAPTER X

SOURCES OF CONTRACEPTIVE INFORMATION

Although information concerning sources of contraceptive knowledge was not asked for in the questionnaire, it was volunteered by one hundred individuals, and can therefore be usefully tabulated. Where an appliance is said to have been fitted by a doctor, it is not clear whether the doctor was the primary source of the information. Hence a distinction is drawn between such cases and those in which advice was said to have been obtained from a doctor.

Tables XLII and XLIII are too scanty to afford much information. The great preponderance of the rubber cap among the recommended methods will be noted, and also the influence of Dr. Stopes' work. Probably some of the women fitted by a doctor or midwife obtained this service at a birth-control clinic, so that the part played by clinics in providing information would be greater than it appears. No light is thrown on the sources of information for other widely used methods.

TABLE XLII
SOURCES OF BIRTH-CONTROL INFORMATION

| Source | Sheath | Sheath + Quinine | C.I. | Cap | Quinine | Speton | Safe Period | Totals |
|--------------------------------------|--------|---------------------|------|-----|---------|--------|-------------|--------|
| Appliance fitted by doctor | — | — | — | 32 | — | — | — | 32 |
| Appliance fitted by nurse or midwife | — | — | — | 4 | — | — | — | 4 |
| Doctor's advice | 2 | — | 2 | 5 | 4 | 2 | — | 15 |
| Nurse's advice | — | — | — | — | — | — | 1 | 1 |
| Clinic | — | 2 | — | 18 | — | — | — | 20 |
| Stopes' books | — | — | — | 23 | — | — | — | 23 |
| Other books | 1 | — | — | 1 | — | — | — | 2 |
| Malthusian League | 2 | — | — | — | — | — | — | 2 |
| Advertisement | — | — | — | 1 | — | — | — | 1 |
| | 5 | 2 | 2 | 84 | 4 | 2 | 1 | 100 |

TABLE XLIII
SOURCES OF BIRTH-CONTROL INFORMATION IN DIFFERENT SOCIAL GROUPS

| Source | I | II | III | IV | V | VII | Total |
|---|----|----|-----|----|---|-----|-------|
| Appliance fitted by doctor | 29 | 1 | 1 | 1 | 0 | 0 | 32 |
| Appliance fitted by nurse or midwife .. | 1 | 0 | 1 | 2 | 0 | 0 | 4 |
| Doctor's advice | 13 | 1 | 0 | 0 | 0 | 1 | 15 |
| Nurse's advice | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Clinic | 13 | 2 | 2 | 3 | 0 | 0 | 20 |
| Stopes' books | 16 | 4 | 1 | 2 | — | — | 23 |
| Other books | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| Malthusian League | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| Advertisement | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 76 | 9 | 5 | 9 | 0 | 1 | 100 |

PART III

CHAPTER XI

QUESTIONNAIRES COLLECTED BY NURSE DANIELS

The material to be analysed in the present section consists of a number of questionnaires collected by Nurse Daniels. The questionnaires were sent out by Nurse Daniels to a large number of persons who had been supplied and fitted by her with Dutch caps. The proportion of questionnaires sent out which were filled in and returned cannot be ascertained. In Table XLIV are given the numbers available for analysis.

TABLE XLIV

NUMBER OF QUESTIONNAIRES RECEIVED FROM NURSE DANIELS

| | | |
|--|---------|-------|
| Questionnaires in which the date when the Dutch cap was first used is given | | 166 |
| Questionnaires in which this date is not given | | 32 |
| | | <hr/> |
| Total | | 198 |
| | | <hr/> |

It appears that these do not include all the questionnaires returned. According to information received from Nurse Daniels, a certain number were destroyed because they contained no information other than that the method had been a success. The table given includes all the questionnaires seen by the present writer.

The following is a copy of the questionnaire:

QUESTIONNAIRE

Date when the Dutch cap was fitted.
Had you had a pregnancy before you came to me?

SECTION 1

Have you had a pregnancy since you began to use it?
If so, was it at your own desire?
If it was undesired, was it because you—

- (a) Omitted to use the cap?
- (b) Omitted to syringe?
- (c) Did not insert the cap properly?

If not attributable to any of these causes, can you suggest any reason for the failure?

(This is very important, and I shall be glad to have your opinion on the matter.)

SECTION 2

Many women have told me that they are much happier since using the cap, also that their health has improved, and some have told me that the health of their husbands has also improved.

Would you be so kind as to relate your own experience in this matter?

.....

If the cap has been entirely successful—

Do you continue to syringe the next morning?

Do you find the syringing troublesome?

Do you use anything else with the cap, i.e. a *contraceptive* jelly smeared on the cap, or a dissolving pessary of any kind?

Do you consider it a trouble to have to insert the cap?

Does your husband use a preventive as well?

Has it entirely relieved you from anxiety?

Has the use of the Dutch cap enabled you to have more enjoyment from the marriage relation?

The following question is one of the most important, as this is one of the things we are trying to find out. Do please try and answer it.

Did you have orgasm before you used the cap?

Have you had it since?

(The orgasm is a sign of complete satisfaction in the woman. It is a special feeling which spreads over the whole body and seems to carry you away.)

Can you suggest any way in which the Dutch cap can be improved?

SECTION 3

If for any reason other than failure you have ceased to use the cap, do you mind stating your objections to its use?

Have you adopted any other method?

For yourself—

(a) Dissolving pessaries or capsules?

(b) The check pessary which fits over the womb?

(c) "Being careful", i.e. not letting yourself go?

For your husband—

(a) Withdrawal, i.e. being careful?

(b) The sheath or French letter?

Do you find that either of these two methods has any ill-effect on the health or temper of your husband?

Do you find that you are able to get complete satisfaction with them?

It will be seen that the questionnaire deals with one method, the Dutch cap. Any information given with regard to other methods is

incidental. Obviously, such information is extremely biased, since persons satisfied with the use of other methods would not come under consideration. The range of data given is very limited and largely of a subjective nature. The main body of information derived from the questionnaires concerns the psychological reactions of individuals to the Dutch-cap method. The social status or husband's occupation of the individuals replying to them is not given. From information received from Nurse Daniels it would appear that the majority of women had husbands who are clerks, skilled or semi-skilled workers.

In Table XLV are summarised the data derived from these questionnaires as to the reliability of the Dutch-cap method. Seven cases included as successes in Table XLV appeared at first sight to be failures. A pregnancy had occurred after using the method, and the answer to the question "Was it at your own desire?" was "No". However, the answer to the question "Was it because you omitted to use the cap?" was "Yes". Assuming that the writer of the questionnaire was endeavouring to be truthful, it appears that these are instances of a conflict of intentions such as was referred to in Part II. Some clinic reports classify similar cases as failures. To the present writer it seems clear that it is a complete misuse of language to describe a pregnancy which occurs when a method is not used as due to the failure of that method. Occurrences of this nature may point to the fact that the method in question is unacceptable or impracticable. As far as the question of reliability is concerned, pregnancies which occur in the way we have been discussing should be classed as intentional pregnancies. In other respects the first column of figures in Table XLV is compiled on similar lines to the Table of Reliability of Methods given in Part II.

The undated cases have been included in the table because the discrepancy between the percentage of success among those and among the dated cases cannot be ignored. The undated questionnaires are much less fully filled up than the dated ones. These circumstances suggest that, among the women who received the questionnaires, those who were enthusiastic about their experience were more likely to take some trouble to fill in the questionnaire. It is possible that there would have been a considerably higher proportion of failures among those women who did not reply to the questionnaires. For various reasons set forth in this and in preceding paragraphs, it does not appear that very great weight can be attached to the estimate

of reliability derived from the material under discussion. On the other hand, we cannot overlook the possibility that, by expert fitting and instruction, Nurse Daniels may obtain a higher percentage of success for the Dutch-cap method than was recorded for the same method in the material discussed in Part I.

The answers to the questions relating to previous pregnancies are of very little value, since neither the number of pregnancies nor the length of the period during which they occurred is stated. Of the 149 individuals who used the Dutch cap successfully for over a year, 108 had had a pregnancy previous to using the method, and twenty-one abandoned the method in order to become pregnant. The latter figure includes the seven cases discussed in a previous paragraph.

The reasons given in the questionnaire for the failure of the method are set out in Table XLVI. The table also indicates whether syringing or a contraceptive jelly was used.

TABLE XLVI
REASONS GIVEN FOR FAILURE OF DUTCH CAP

| Reasons Given | Syringing Used | Contraceptive Jelly Used |
|---|----------------|--------------------------|
| 1. Split in cap | Yes | Yes |
| 2. Cap stretched | Yes | ? |
| 3. Omitted to syringe | No | Yes |
| 4. Constipation | ? | ? |
| 5. Possibly constipation | ? | Yes |
| 6. Ring worn for prolapsed uterus | ? | ? |
| 7. Cap unused for six months, may have ceased to fit | ? | Yes |
| 8. No reason | Yes | Yes |
| 9. No reason | ? | Yes |
| 10. No reason | Yes | Yes |
| 11. No reason | Yes | Yes |
| 12. No reason | ? | ? |

A query in one of these columns indicates that no information concerning these points was given.

Dr. Blacker in his recent annual report on contraceptive studies issued under the auspices of the Birth Control Investigation Committee classified clinic failures as being due to—

- (a) Defect in the appliance.
- (b) Omission to carry out instructions, including the prevention of constipation.
- (c) Other causes.
- (d) No ascertainable cause.

Adopting this classification, the twelve failures would be classified as follows:

TABLE XLVII
TYPES OF FAILURE WITH DUTCH CAP

| | | | | | | |
|------------------------|----|----|----|----|----|-------|
| Defect failures | .. | .. | .. | .. | .. | 2 |
| Omission failures | .. | .. | .. | .. | .. | 3 |
| Other causes | .. | .. | .. | .. | .. | 1 |
| Unaccountable failures | .. | .. | .. | .. | .. | 6 |
| | | | | | | <hr/> |
| | | | | | | 12 |

However, this table is very ambiguous, as sufficient information is not available concerning the cases.

Among the individuals who are classed as successful, eighty-four stated that they invariably employed syringing, together with a contraceptive jelly. There are three failures involving the use of both. Thus, for the complete method, Dutch cap, syringing and contraceptive jelly, the percentage of success derived from these data would be 95 per cent. This figure includes both dated and undated cases. Hence it would appear that the probability of success is somewhat higher when these adjuncts are used. On the other hand, their use does not guarantee success.

A good deal of information is given in the questionnaires with reference to individual reactions to the Dutch-cap method. In this, as in other matters, it must be emphasised that the information supplied may constitute an extremely biased sample. Some of the questions in Section 2 were intended to discover whether the Dutch-cap method proved troublesome or impractical in use. Out of the total number of successful cases, 135 women, or 91 per cent., stated that they syringed after use. Nineteen of these, or 14 per cent., found it troublesome. In addition, the fact that syringing was a difficulty is given as a reason for abandoning the method in four cases. Among all the cases, nineteen women found the cap difficult to insert. The difficulty led to the method being abandoned in four cases. As will be seen in

Table XLVIII, these two factors constitute the main difficulties in using the method, and are evidently by no means negligible.

In Table XLVIII are summarised the reasons given for abandoning

TABLE XLVIII

SUMMARY OF REASONS FOR ABANDONING USE OF DUTCH CAP

| | Number of Cases |
|----------------------------------|-----------------|
| Husband objected | 5 |
| Syringing troublesome | 4 |
| Difficulty in insertion | 4 |
| Feeling of insecurity | 4 |
| Constipation | 3 |
| Cap painful | 2 |
| Cap displaced in morning .. | 1 |
| Cap irritated | 1 |
| Objection to making preparations | 1 |
| Medical advice | 1 |
| Displaced uterus | 1 |

the Dutch-cap method after trial. The number of entries is larger than the total number of cases, as certain individuals give more than one reason for abandoning the method.

TABLE XLIX

METHOD USED AFTER DUTCH CAP ABANDONED

| | Satisfactory | Unsatisfactory | Total |
|--------------------------|--------------|----------------|-------|
| Sheath | 6 | 3 | 9 |
| Sheath and syringing .. | 1 | 0 | 1 |
| Coitus interruptus | 2 | 2 | 4 |
| Being careful | 0 | 1 | 1 |
| Cervical cap | 1 | 0 | 1 |
| Dumas cap | 1 | 0 | 1 |
| Quinine | 2 | 0 | 2 |
| Syringing | 1 | 0 | 1 |
| | 14 | 6 | 20 |

The entry "husband objected" covers a variety of objections. In some cases no reason is given for the objection. In others the cap could be felt during intercourse. This would probably be due to incorrect insertion, as when the cap is properly inserted its rim need

TABLE L
CASES IN WHICH INFORMATION WAS GIVEN WITH REFERENCE TO THE OCCURRENCE OF ORGASM

| | Number | Percentage | Totals | |
|--|--------|------------|--------|------------|
| | | | Number | Percentage |
| <i>A. Cases in which orgasm was experienced:—</i> | | | | |
| (i) No change | — | 58.7 ± 4.2 | 81 | |
| (ii) <i>Satisfaction increased—</i> | | | | |
| (a) No orgasm before use of cap; orgasm after | 30 | | | |
| (b) Frequency of orgasm increased after use of cap | 17 | | | |
| Total of (a) and (b) | 47 | 34.1 ± 4.0 | 47 | |
| (iii) <i>Satisfaction diminished—</i> | | | | |
| (c) Orgasm before use of cap; none after | 7 | | | |
| (d) Frequency of orgasm diminished | 3 | | | |
| Total of (c) and (d) | 10 | 7.2 ± 2.2 | 10 | |
| TOTAL OF (i), (ii), and (iii) | | | 138 | 90 ± 2.4 |
| <i>B. Cases in which no orgasm was experienced</i> | | | | |
| TOTAL OF A AND B | | | 153 | 10 ± 2.4 |

not come in contact with the penis. It can easily do so, however, if incorrectly inserted. The suggestions given for improvement of the cap corroborate the findings of the previous paragraph. The great majority of users have no suggestion to make. Four individuals would like to see the necessity for syringing eliminated, and four would like the rim of the cap made more pliable. In the foregoing table are summarised the methods adopted after abandonment of the Dutch cap where these are given.

The replies to the question relating to the occurrence of orgasm have some interest. This question was answered in 153 questionnaires. The replies are summarised in Table L.

The percentage of individuals who had never experienced an orgasm is small, but again it is highly probable that the percentage might be very different among the inarticulate individuals. As would be expected in view of the inhibiting effects of the fear of pregnancy, there is a considerable percentage of individuals whose capacity for physical enjoyment was increased after using the method. There is also a considerable number to whom it made no difference, and a certain number who were affected in the opposite way. As far as the very restricted sample here examined is concerned, it may be said that there is evidence of some effect of the Dutch-cap method in increasing the capacity for physical enjoyment. In view of the selected nature of the sample, it is perhaps permissible to add that the figures given do not suggest that in this respect the Dutch cap offers any very striking advantages over other methods, though direct comparison is impossible.

In Table LI are summarised the answers to the question relating to general effects on health and happiness.

The great majority of women who answered the questionnaire find some improvement in health and happiness. In most cases this was said to have been due to the absence of fear of an unwanted pregnancy. Certain individuals also refer to the benefits derived from giving up other more deleterious methods.

The question relative to enjoyment derived from the marriage relation was evidently answered in two ways. It was either taken to refer to physical enjoyment or to general marital happiness. Consequently the answers are a repetition of some of the answers summarised in the two previous tables. The answers to this question are summarised in Table LII.

The data with reference to methods employed before using the

Dutch cap are very scanty. They obviously yield no information of value with reference to these methods except in so far as they indicate that in a certain number of cases the Dutch cap can be used successfully where other methods have proved unsatisfactory. The data are summarised in Table LIII. These cases are balanced to some

TABLE LI

EFFECT OF DUTCH-CAP METHOD ON HEALTH AND HAPPINESS
(SUCCESSFUL CASES)

| | | | | | | |
|---|--|--|--|--|--|-----------------------|
| I. Number of cases in which comments are made on health and happiness | | | | | | 122 |
| Number of cases with no previous experience | | | | | | 10 |
| Number of cases with experience of marriage before and after use of cap | | | | | | 112 |
| II. A. <i>Effect on health</i> — | | | | | | Number of Cases |
| (i) Health of husband improved | | | | | | 6 |
| (ii) Health of wife improved | | | | | | 12 |
| (iii) Health of both improved | | | | | | 38 |
| Total of (i), (ii), and (iii) | | | | | | 56 |
| B. <i>Effect on happiness</i> — | | | | | | |
| Happiness increased | | | | | | 68 |
| III. (a) Total number of cases in which either happiness or health or both was increased .. | | | | | | Number 95* |
| (b) Total number of cases in which no change was noted | | | | | | Percentage 84.8 ± 3.4 |
| Total of (a) and (b) | | | | | | 17 |
| | | | | | | 15.2 ± 3.4 |
| | | | | | | 112 |

* *N.B.*—This figure includes one case not recorded in Section II of the table, in which the wife's health suffered, the husband's health improved, and the happiness of both was increased.

extent by the cases previously given in which some other method proved satisfactory after the Dutch cap had been abandoned.

Estimates of the reliability of the Dutch cap derived from various sources will be compared in a later chapter. We have seen that there is considerable doubt about whether the questionnaires available for analysis in this chapter represent a random sample of those who

use the method. Consequently little value can be attached to the percentage of successes derived from them. The two principal difficulties in using the Dutch cap appear to be the necessity of syringing

TABLE LII

RELATION BETWEEN USE OF DUTCH CAP AND ENJOYMENT OF MARRIAGE
RELATION

| | Number | Percentage |
|--|--------|----------------|
| Number of cases in which enjoyment was increased | 132 | 94.3 ± 2.0 |
| Number of cases in which no change was noted | 8 | 5.7 ± 2.0 |
| Total number of cases replying to this question | 140 | |

and difficulty in inserting the cap. These prove insuperable obstacles in only a small number of cases. Among the individuals who were introduced to this method by Nurse Daniels, and whose experiences

TABLE LIII

METHODS ADOPTED BEFORE USING DUTCH CAP

| Method | Number of Cases | Satisfactory | Unsatisfactory | Detrimental to Husband |
|------------------------|-----------------|--------------|----------------|------------------------|
| Sheath | 21 | 1 | 20 | 8 |
| Coitus interruptus .. | 20 | — | 20 | 11 |
| Quinine | 9 | — | 9 | 2 |
| Cervical cap | 10 | 1 | 9 | 1 |
| Being careful | 7 | — | 7 | 1 |
| At least one method .. | 31 | 2 | 29 | — |
| All methods | 6 | — | 6 | — |

are available, the great majority find the method satisfactory, and state that their health and happiness have increased. By employing this method a certain number have been enabled to derive more physical satisfaction from the marriage relationship.

PART IV

CHAPTER XII

REPORTS FROM THE BIRMINGHAM WOMEN'S WELFARE CENTRE

The material to be dealt with in this chapter consists of reports on cases dealt with by the Birmingham Women's Welfare Centre. A visitor called upon the women who had visited the clinic, and enquired whether the method advised had been used and whether it had been successful. Entries were also made under the following headings: Difficulties in use, reason of failure, objections, effect of birth control, and general remarks. The heading "effect of birth control" yields nothing but a frequent "G". In addition to the visitor's report some information with reference to the individuals

TABLE LIV

VISITOR'S REPORTS ON BIRMINGHAM CLINIC CASES

| | |
|---|-------|
| Cases visited' | 400 |
| No report | 97 |
| Woman pregnant at time of visiting clinic or not fitted for some other reason | 59 |
| | <hr/> |
| | 156 |
| | 156 |
| | <hr/> |
| Cases available for analysis | 244 |
| | <hr/> |

concerned was obtained from the Centre case sheets. These give age of wife at marriage, date of marriage, number of pregnancies and children born alive, husband's occupation and wife's allowance. They also give the size of Dutch cap fitted, and indicate whether a visit was paid to the Centre six months after fitting. The visitor's reports do not include any case in which less than two and three-quarter years had elapsed between the initial fitting and the report. Some of them cover a period of slightly more. It can be said without great inaccuracy that the cases to be discussed represent an average period of about three years' use of contraceptive methods. No information is available about whether or not the individuals reported on had or had not been in touch with the clinic continuously during the intervening period. The intention of the Birmingham clinic was

to collect 400 visitors' reports. The first 250 cases attending the clinic were visited, and then the cases numbered 500 to 650. As will be seen from Table LIV, the number of cases available for analysis is 244.

The number of individuals classified according to their husbands' occupations is given in Table LV. The Census groups have again been used. There is an excess of Group I and Group V, and a deficiency of Group II, but on the whole the proportion from the different groups corresponds fairly closely to their distribution in the population as a whole.

TABLE LV

BIRMINGHAM CLINIC CASES CLASSIFIED ACCORDING TO CENSUS GROUPS

| Census Group | Number of Cases | Percentage | Percentage in Population, 1921 |
|--------------|-----------------|--------------|--------------------------------|
| I | 19 | 8 ± 1.8 | 2.33 |
| II | 21 | 9 ± 1.8 | 20.35 |
| III | 104 | 43 ± 3.2 | 43.49 |
| IV | 53 | 22 ± 2.7 | 20.45 |
| V | 44 | 18 ± 2.2 | 13.40 |
| Not known | 3 | — | — |
| | 244 | | |

In contradistinction to the materials analysed in Part II, the majority of the women who are the subjects of the present analysis belong to the groups of skilled and semi-skilled workers who together constitute 65 per cent. of the total. The average amount of the wife's allowance in the cases analysed was £2 8s. per week. This figure affords only a very rough guide to the economic status of the households. To make an accurate estimate much information which is not available would be necessary. The available data concerning the previous history of the women relevant to the present investigation are summarised in Table LVI. Full particulars are recorded for 229 out of the 244 cases.

In order to compile a correlation table which can be compared with tables already given, the reproductive period has been taken as terminating at forty-two. Seven women were over forty-two years old

at the time of their first visit to the clinic. The average age of these women was forty-five years. Table LVII is a correlation table for 229 cases in which the number of pregnancies is correlated with the duration of the reproductive period. The correlation coefficient is 0.72. If this figure is compared with the correlation coefficients given in Part II, it will be seen that it is somewhat higher than the correlation coefficient given there for a group of 149 women who had had at least one contraceptive failure. There are unfortunately no means of knowing whether the Birmingham women had employed any form of contraceptive method before visiting the Centre. From general experience of similar cases, it is safe to assume that the husbands of some at least had practised coitus interruptus. The high correlation between duration of reproductive life and number of pregnancies suggests

TABLE LVI

PREVIOUS HISTORY OF BIRMINGHAM CENTRE CASES

| | | |
|--|---------|----------------------|
| Mean age at marriage | | 22.5 years \pm 0.2 |
| Mean duration of reproductive period from | | |
| marriage to first visit to centre | | 9.6 years \pm 0.3 |
| Mean number of pregnancies | | 4.0 \pm 0.2 |
| Mean number of children born alive | | 3.6 \pm 0.2 |
| Percentage of miscarriage and still-births | | 10 per cent. |
| Mean age at first visit to centre | | 32.2 years |

that on the whole any attempts at contraception had met with very little success. There is a group of cases in the left-hand bottom corner of the correlation table which can only be explained on one of two assumptions. Either these women had practised contraception successfully for some time, or natural infertility had kept the number of pregnancies down to a small number.

The contraceptive method usually advised at the Birmingham Centre is the Dutch cap. The average size fitted for the cases under consideration was $72\frac{1}{2}$, ranging from $57\frac{1}{2}$ to $87\frac{1}{2}$. The cases in which a failure occurred averaged 71, but in view of the small number involved this difference is probably not significant. In certain cases other methods were advised. The contraceptive method actually employed differed frequently from the one advised at the Centre. The methods advised and employed are tabulated in Table LVIII.

TABLE LVII
CORRELATION BETWEEN DURATION OF REPRODUCTIVE PERIOD AND NUMBER OF PREGNANCIES

| NUMBER OF PREGNANCIES | | | | | | | | | | | | | | | | | | |
|-----------------------|---|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
| 1 | 1 | 7 | 1 | | | | | | | | | | | | | | | 9 |
| 2 | 2 | 8 | 5 | 3 | | | | | | | | | | | | | | 15 |
| 3 | | 2 | 5 | 2 | 2 | 1 | | | | | | | | | | | | 10 |
| 4 | | 9 | 8 | 5 | 7 | 2 | | | | | | | | | | | | 19 |
| 5 | 1 | 2 | — | 6 | 4 | 1 | 3 | 1 | | | | | | | | | | 11 |
| 6 | | | 5 | 4 | 4 | 1 | | | | | | | | | | | | 15 |
| 7 | | 1 | 4 | 5 | 4 | 2 | | | | | | | | | | | | 16 |
| 8 | | 1 | 2 | 5 | 4 | 1 | | | | | | | | | | | | 11 |
| 9 | | 1 | — | 3 | 6 | 2 | 3 | | | | | | | | | | | 10 |
| 10 | | 1 | 1 | 2 | 4 | 1 | 1 | 1 | 1 | | 1 | | | | | | | 13 |
| 11 | | | 1 | 2 | 3 | 1 | 4 | 2 | 2 | 1 | | | | | | | | 10 |
| 12 | | | 1 | 2 | 3 | 2 | 1 | 2 | | | | | | | | | | 17 |
| 13 | | | 2 | 3 | — | 2 | 1 | | | | | | | | | | | 13 |
| 14 | | 3 | 1 | 3 | | 2 | | | | | 1 | | | | | | | 8 |
| 15 | | | 1 | 1 | 1 | 2 | 1 | 4 | 2 | 1 | | | | | | | | 9 |
| 16 | | 1 | 1 | | 1 | 1 | | 2 | 1 | 1 | 1 | 2 | 1 | | | | | 3 |
| 17 | | | 1 | | 1 | 1 | | | | | | | | | | | | 3 |
| 18 | | | 1 | | 1 | 1 | | | | | 1 | 2 | | | | | | 9 |
| 19 | | | 1 | | 1 | 1 | | | | | 1 | | 1 | | | | | 3 |
| 20 | | | 1 | | 1 | 1 | 1 | | | | 1 | | | 1 | 1 | | | 5 |
| 21 | | | | | | | | | | | | 2 | | | 1 | | | 2 |
| 22 | | | | | | | | | | | | 1 | | | | 1 | | 3 |
| 23 | | | | | 1 | | | | | | | | | | | | 1 | 1 |
| 24 | | | | | | | | | | | | | | | | | | — |
| 25 | | | | | | | | | | | | | | | | | | — |
| 26 | | | | | | | | | | | | | | | | | | 1 |
| TOTALS .. | 4 | 36 | 39 | 42 | 39 | 18 | 14 | 11 | 8 | 3 | 4 | 6 | 1 | | 2 | 1 | 1 | 229 |

$$\sigma_r = 0.032$$

$$r = 0.721$$

TABLE LVIII
METHODS EMPLOYED AND METHODS ADVISED AT BIRMINGHAM CENTRE

| Method Advised | Number of Cases | Method Employed | Number of Cases | Total | Methods Employed, Cases Summarised | Total Number of Cases |
|----------------------|-----------------|--|--------------------------------|-------|--|---|
| Dutch cap | 216 | Dutch cap Coitus interruptus .. Sheath Quinine and syringe C.I. and quinine .. No method .. | 171 24 3 1 1 16 | | Dutch cap Large Dumas .. Small Dumas .. Dumas and sheath .. Cervical cap .. Sheath Sheath and C.I. .. Coitus interruptus .. Quinine and C.I. .. Quinine and syringe No method .. | 172 7 1 1 3 9 1 30 2 1 17 |
| Large Dumas .. | 8 | Large Dumas .. Coitus interruptus .. | 7 1 | 216 | | |
| Sheath | 8 | Sheath Coitus interruptus .. | 6 2 | 8 | | |
| Cervical cap .. | 6 | Cervical cap .. Coitus interruptus .. | 3 3 | 8 | | |
| Small Dumas .. | 2 | Small Dumas .. No method .. | 1 1 | 6 | | |
| Dutch cap and sheath | 2 | Dutch cap Sheath and C.I. .. | 1 1 | 2 | | |
| Dumas and sheath .. | 1 | Dumas and sheath .. | 1 | 2 | | |
| Quinine | 1 | Quinine and C.I. .. | 1 | 1 | | |
| | 244 | | | 244 | | 244 |

The Dutch cap was advised in 216 cases. The results are summarised in Table LIX.

Under the heading "successes" are included all those cases in which the method was apparently used continuously for the whole period of

TABLE LIX

RESULTS OF USING THE DUTCH-CAP METHOD

| | | | | | |
|--|----|----|----|----|-----|
| Method used successfully | .. | .. | .. | .. | 116 |
| Method used successfully, but woman over forty-two when fitted | .. | .. | .. | .. | 2 |
| Method a failure | .. | .. | .. | .. | 14 |
| Method abandoned after trial | .. | .. | .. | .. | 35 |
| Method partially abandoned | .. | .. | .. | .. | 4 |
| Method not used | .. | .. | .. | .. | 45 |
| Total | .. | .. | .. | .. | 216 |

Percentage of successes = 89.2 ± 2.7

Percentage of cases in which method was abandoned or not used for reasons other than failure = 39.3 ± 3.9 .

three years, and the woman using it was not over forty-two at the time of fitting. The two older cases may possibly include one in which conception was prevented, fifteen pregnancies having already occurred. The other individual who had been married twenty-six

TABLE LX

REASONS GIVEN FOR FAILURE OF THE DUTCH-CAP METHOD

| | | | | |
|-----------------------------------|----|----|----|---|
| Omitted to carry out instructions | .. | .. | .. | 6 |
| Constipation | .. | .. | .. | 1 |
| Total omission failures | .. | .. | .. | 7 |
| Torn cervix | .. | .. | .. | 1 |
| Hæmorrhoids | .. | .. | .. | 1 |
| Reason unknown | .. | .. | .. | 5 |

years had one pregnancy. Without more information, it is difficult to see what reason there can have been to expect another pregnancy in this case. The percentage of successes is higher than that found in the Birth Control Investigation Committee's questionnaires, but not

as high as that found in Nurse Daniels's questionnaires. The reasons given in the reports for the failure of the Dutch-cap method are analysed in Table LX.

Half the failures can be classified according to the reports as omission failures, while over a third are unaccountable failures. The previous history of the successes and failures is summarised in Table LXI, from which it will be seen that in respect of duration of marriage and number of pregnancies there is no significant difference between the two groups.

The reasons given for not using the Dutch cap when advised are summarised in Table LXII. This table also summarises the reasons other than failure given for abandoning the method after trial.

The sixteen cases of intentional pregnancies include six cases in which the method was said to have failed, but the cap had only been

TABLE LXI
PREVIOUS HISTORY OF SUCCESSES AND FAILURES

| | Duration of Marriage (Years) | Number of Pregnancies | Number of Children Born Alive |
|----------------|---------------------------------|--------------------------|----------------------------------|
| Successes .. | 8.6 ± 0.5 | 3.9 ± 0.3 | 3.5 ± 0.5 |
| Failures | 8.2 ± 0.9 | 4.0 ± 0.6 | 3.7 ± 0.6 |

worn intermittently. As was indicated in Part III, these cases cannot justifiably be regarded as failures of the method advised. Certain of the reasons given, viz. pregnancy, hysterectomy, menopause, and absence of husband, afford no indication about the desirability or practicability of the method. When such cases are deducted, there remain, out of a total of 174, 52 cases in which the method was unacceptable for reasons other than failure, i.e. 30 per cent. It is rather surprising that there should be such a high proportion of women who found the method advised unacceptable in view of the fact that they had received expert advice and that several methods were available at the Centre. Among the three women who used a sheath when the Dutch cap had been advised, one is said to have had two unwanted pregnancies. There were also two failures with coitus interruptus among the women who did not try the Dutch cap. Clearly the Birmingham Centre did not succeed in making the Dutch-cap method acceptable to this group of women. Whether

any of the other known contraceptives would have met their needs better cannot be ascertained. Any birth-control clinic is confronted with a difficulty in that those in charge naturally wish to recommend the contraceptive method which they believe to be most reliable. From the point of view of the woman who has to use it, a less reliable method which she can readily use is better than a more reliable method which she can only use with difficulty. On the other hand, if

TABLE LXII

REASONS GIVEN FOR NOT USING OR ABANDONING THE DUTCH-CAP METHOD

| Reason Given | Method Not Tried | Method Abandoned After Trial | Method Partially Abandoned | Total |
|--|------------------|------------------------------|----------------------------|-------|
| Pregnant when fitted or became pregnant .. | 9 | 16 | — | 25 |
| Prolapsed uterus .. | 7 | — | — | 7 |
| Disliked cap | 6 | — | — | 6 |
| Unable to use cap .. | 5 | — | — | 5 |
| Husband objected .. | 4 | 1 | — | 5 |
| Cap uncomfortable .. | 3 | — | — | 3 |
| Too much trouble .. | 3 | 3 | — | 6 |
| Discharge or inflammation | 2 | 1 | 2 | 5 |
| Used too hot water for syringing | 1 | — | — | 1 |
| Hysterectomy | 1 | 2 | — | 3 |
| Menopause | — | 3 | — | 3 |
| Cap worn out | — | 3 | — | 3 |
| Feeling of insecurity .. | — | 1 | — | 1 |
| Husband away | — | 1 | — | 1 |
| Reason unknown .. | 3 | 3 | 2 | 8 |

the clinic recommends such unreliable methods, its reputation and hence its capacity for further useful work are likely to be damaged.

The data concerning the Dutch-cap method derived from all three sources discussed will be summarised in Chapter XIII. The information concerning the other methods advised by the Birmingham Centre is so scanty that all can conveniently be tabulated together. The results of using other methods are shown in Table LXIII.

In one case in which the Dutch cap and sheath together were advised, the cap alone was used and was a failure, apparently because the

person who used it omitted to syringe. If this case were included in the table for the reliability of the Dutch cap, the percentage of successes would be 88·5. Taking all the cases in which a method advised at the centre was adopted and can be classified, either as a success or a failure, the total number is 145, and the percentage of success is 89·6. Excluding cases of pregnancy and menopause, the method advised by the Centre proved unacceptable for reasons other than failure in 63 cases out of 196, i.e. in 32 per cent. The reason given for the failure of the large Dumas cap is constipation. Some individuals advised to use either the Dumas or the cervical cap did not do so because they found it too troublesome or difficult to use.

TABLE LXIII

RESULTS OF USING METHODS OTHER THAN DUTCH CAP ADVISED BY THE BIRMINGHAM CENTRE

| Method | Number of Successes | Number of Failures | Method Abandoned or Not Tried | Total |
|-------------------------|------------------------|-----------------------|-------------------------------------|-------|
| Large Dumas | 4 | 1 | 3 | 8 |
| Sheath | 6 | 0 | 2 | 8 |
| Cervical cap | 3 | 0 | 3 | 6 |
| Small Dumas | 0 | 0 | 2 | 2 |
| Dutch cap and sheath .. | 0 | 0 | 2 | 2 |
| Dumas and sheath .. | 1 | 0 | 0 | 1 |
| Quinine | 0 | 0 | 1 | 1 |
| Total | 14 | 1 | 13 | 28 |

In two cases the Dumas cap was given up because the woman wished to become pregnant. The unwanted pregnancies among the women who did not use the method advised at the Centre are summarised in Table LXIV. One of the women whose husband used the sheath had two unwanted pregnancies, and among those who used no method there were three who experienced two undesired pregnancies each. The figures given in this table are not of the same order of accuracy as those concerning the success of methods advised by the Centre.

The number of cases included in this table is so small that it would be rash to draw conclusions, but the fact that a pregnancy only

occurred in one out of four cases where no contraceptive method was employed does suggest that the number of cases in which a contraceptive method was employed and regarded as successful is very much greater than the number of cases in which contraception was actually prevented. In a later chapter other considerations will be adduced to indicate that the probability of a pregnancy in the absence of contraception among individuals who practised the Dutch cap successfully was very high. If, therefore, we are to attach any weight to the frequency of pregnancy among this very small group of women, we must conclude that abandoning any kind of

TABLE LXIV
SUCCESS OF METHODS NOT ADVISED BY CENTRE

| Method | Number of Cases in which Method was Used | Failures |
|----------------------------|--|----------|
| Sheath | 9 | 2 |
| Coitus interruptus | 30 | 3 |
| Quinine and C.I. | 2 | 1 |
| Quinine and C.I. | 1 | 0 |
| Sheath and C.I. | 1 | 0 |
| | — | — |
| | 43 | 6 |
| No method | 17 | 6 |
| Total | 60 | 12 |

contraceptive method is not unconnected with their lack of any need for contraception.

Where a contraceptive method advised by the Birmingham Centre was adopted, the percentage of success was very high, and out of the fifteen failures recorded, eight were attributed to failure to carry out the instructions received. On the other hand, nearly a third of the individuals advised found that they could not use the method which they had been taught. We must also take into account the group of women who became pregnant because they did not always wear a cap or omitted to replace it. In these cases pregnancy was said to have been undesired. Possibly, therefore, they may be taken as further indications of the unacceptability of the method. The

omission failures may also indicate the difficulty of carrying out the complete method under all circumstances. These facts suggest the desirability of recommending to certain women simpler, even if less reliable, methods. They also point to the need for improvement in after-care work at clinics. When everything possible has been done, there remains the possibility that there is a residuum of women who, whatever they say, do not really want to use any contraceptive, and will sometimes omit to use any method recommended to them.

CHAPTER XIII

SUMMARY OF EVIDENCE RELATING TO THE DUTCH-CAP METHOD

Data from three different sources bearing upon contraceptive experience have now been presented. The Dutch cap alone figures prominently in all three sets. The three different lines of evidence will now be summarised. Considerable difficulty has arisen in compiling and comparing the results obtained by clinics which advocate some variety of rubber cap. There are two reasons for the difficulty. In the first place the method is believed to stand a better chance of success when fitted by an expert. In the second place it is the usual practice to recommend one or more—often two—adjuncts to the cap, such as contraceptaline and syringing. A logical way of treating the subject would be to regard each way of using the cap as a separate method. For example, the cap self-fitted would be one method, the cap fitted by a doctor and used alone another, the cap with contraceptaline and syringing another. Each method should be studied separately with reference to reliability and acceptability. Unfortunately this plan can seldom be carried out in practice, as records of how the cap is actually used are rarely kept. Only when a failure occurs is some attempt made to find an omission which can explain the failure. In the Birth Control Investigation Committee's questionnaires and in Nurse Daniels's questionnaires questions were framed so as to elicit information on the lines outlined above. The answers are not, however, sufficiently complete to be of very much service. In Table LXV the information available is summarised. The accuracy of the replies cannot of course be guaranteed. The table is inserted as an indication of the way in which the subject should be treated. Although the percentage of success increases in the way which would be expected, the standard deviations of the percentages are too great to enable any conclusion to be drawn. The headings "B.C.I.C." and "N.D." refer to the questionnaires collected by the Birth Control Investigation Committee and Nurse Daniels respectively. No data of this kind are available from the Birmingham Centre, as details of the way in which the cap was used are only given when a failure occurs.

TABLE LXV
SUMMARY OF RESULTS OF DIFFERENT WAYS OF USING THE DUTCH CAP

| Way in which Cap was Used | Source | Successes | Failures | Percentage Success |
|--|----------|-----------|----------|--------------------|
| A. Not fitted by Doctor or Midwife. | | | | |
| (i) No adjunct mentioned .. | B.C.I.C. | 2 | 0 | |
| (ii) + syringing .. | B.C.I.C. | 2 | 1 | |
| (iii) + contraceptive jelly .. | B.C.I.C. | 1 | 1 | |
| (iv) + quinine .. | B.C.I.C. | 3 | 0 | |
| (v) + syringing + contraceptive jelly .. | B.C.I.C. | 1 | 0 | |
| TOTAL .. | | 9 | 2 | 82 ± 12 |
| B. Fitted by Doctor or Midwife. | | | | |
| (i) No adjunct mentioned .. | B.C.I.C. | 3 | 1 | |
| | N.D. | 12 | 2 | |
| TOTAL .. | | 15 | 3 | 83 ± 9 |
| (ii) + syringing .. | B.C.I.C. | 3 | 2 | |
| | N.D. | 58 | 2 | |
| (iii) + contraceptive jelly .. | B.C.I.C. | 2 | 1 | |
| | N.D. | 5 | 2 | |
| (iv) + quinine .. | N.D. | 2 | 0 | |
| (v) + vaseline .. | N.D. | 1 | 0 | |
| TOTAL with one adjunct .. | | 71 | 7 | 91.0 ± 3.3 |
| (vi) + syringing + contraceptive jelly .. | B.C.I.C. | 9 | 2 | |
| | N.D. | 54 | 5 | |
| (vii) + syringing + quinine .. | B.C.I.C. | 4 | 0 | |
| | N.D. | 2 | 0 | |
| (viii) + syringing + soap or vaseline .. | N.D. | 15 | 1 | |
| TOTAL with two adjuncts .. | | 84 | 8 | 91.3 ± 3.0 |

TABLE LXVI
SUMMARY OF RESULTS FOR DUTCH-CAP METHOD

| Source | Total Number of Cases | Number of Successes | Number of Failures | Percentage of Success | Duration of Successful Period (Years) | Percentage of Cases in which Method was Unacceptable |
|---|-----------------------|---------------------|--------------------|-----------------------|---------------------------------------|--|
| Birth Control Investigation Committee | 55 | 30 | 8 | 79 ± 6.6 | 2.6 ± 0.9 | 31 ± 6 |
| Nurse Daniels | 198 | 149 | 12 | 92.5 ± 2.2 | 4 (?) | 11 ± 2 |
| Birmingham Centre | 216 | 116 | 14 | 89.2 ± 2.7 | c. 3 | 32 ± 3 |
| TOTAL | | 295 | 34 | 89.7 ± 1.7 | — | — |

In Table LXVI all the results available for the Dutch-cap method are summarised.

The figure given in Table LXVI as the mean percentage of success derived from all sources is not of much value, as Nurse Daniels's questionnaires, which form the largest sample, have been shown to be very probably biased in favour of success. The difference between the percentages of success derived from the Birth Control Investigation Committee's questionnaires and the Birmingham Centre reports is 10.2 ± 7.1 . It is not, therefore, statistically significant. The mean percentage derived from these two sets of data, i.e. 87 ± 3 , is probably near the true value for the reliability of the Dutch cap on the basis of the present data and according to the criteria laid down in a previous section. Comparing this result with the figures given for the reliability of other methods, it would

TABLE LXVII

SUMMARY OF SUPPOSED CAUSES OF FAILURE OF DUTCH-CAP METHOD

| | | | | | |
|------------------------|----|----|----|----|----|
| Omission failures | .. | .. | .. | .. | 13 |
| Defect failures | .. | .. | .. | .. | 2 |
| Fitting failures | .. | .. | .. | .. | 3 |
| Other causes | .. | .. | .. | .. | 5 |
| Unaccountable failures | .. | .. | .. | .. | 11 |
| | | | | | — |
| | | | | | 34 |
| | | | | | — |

appear that the Dutch cap as commonly used is in general more reliable than the sheath used alone. This does not mean that the Dutch cap, when used alone, is more reliable than or even as reliable as the sheath used alone, because, as commonly used, the Dutch cap does not belong to the category of single methods. It is still more reliable when fitted by a doctor and used in conjunction with syringing and some other adjunct such as contraceptaline or quinine. As far as can be judged from the available data, the Dutch cap when used in this way is not quite as reliable as the sheath used in conjunction with either quinine or syringing.

Failing adequate information about how the Dutch cap was used in all cases, it will be useful to classify the reasons given for failure according to the system already referred to as employed by Dr. Blacker. An additional category will have to be introduced, namely, failures due to incorrect fitting. This reason is naturally

not given in clinic reports, but occurs in the Birth Control Investigation Committee's questionnaires, in some cases in which the appliance was self-fitted. The reasons given are those suggested by the woman using the method. They must therefore be regarded as open to some dubiety. These supposed causes of failure are summarised in Table LXVII. Under the heading "omission failures" are included three cases from the questionnaires of the Birth Control Investigation Committee. In these failure was attributed to carelessness in use. The cases included under the heading "other causes" are all cases in which some reason of an anatomical nature, such as a displaced uterus or a torn cervix, was given for failure.

CHAPTER XIV

A SUGGESTED METHOD FOR THE OBJECTIVE ANALYSIS OF THE RESULTS OF USING A CONTRACEPTIVE METHOD

When a group of women begin to use a new contraceptive method the success or failure of the method is usually estimated without regard to the probable number of pregnancies which would have occurred among such a group if the new method had not been practised. If such an estimate of probable pregnancies could be arrived at, it would provide a valuable check on the more usual estimates of reliability. It cannot be assumed that among a group of women practising contraception all would become pregnant in the absence of contraception. On the contrary, we have seen that in the whole population *about one-sixth of all marriages are sterile*. The usual method of estimating the success of a contraceptive method is to compare the number of women who use it and have no unwanted pregnancies with those who, while using it, experience an unwanted pregnancy. There thus arise two difficulties which are often overlooked. The first is the subjective nature of all statements made concerning wanted and unwanted pregnancies. The second is that the usual method of estimating success can only be used to compare different methods if all biological factors influencing fertility are assumed to be the same in the groups of women using different methods. The latter assumption is unproven.

In the present chapter an attempt will be made to look at the problem of the success or failure of a contraceptive method from a different angle. The women who attended the Birmingham clinic form a group who commenced to use a new contraceptive method after having been married for an average period of about ten years. The period of use of the new contraceptive method was about three years. The problem before us is to discover what difference the use of the Dutch cap made to the fertility of the women in question during the three-year period. It will be noted that this does not involve whether a pregnancy was wanted or not. What we are looking for is the difference between the number of pregnancies which these women would have experienced if they had not begun to use the Dutch cap and the number which they actually did experience while

using it. Such a difference, if it can be discovered, will not necessarily be the same as the number of pregnancies successfully prevented, because we cannot assume that no other contraceptive measures were employed previously or concurrently. It will give an objective estimate of the difference made to the fertility of the women by the introduction of the Dutch cap.

Subject to the amount of error generally pertaining to the data discussed in this analysis, the number of pregnancies actually occurring in the three-year period is known. We have now to consider whether it is possible to arrive at any estimate of the number of pregnancies which would have occurred in this period if the Dutch cap had not been used. The principal fact relevant to this estimate is the number of children born to the women in question before the use of the Dutch cap commenced. It is necessary to assume for the present purpose that if the women had not attended the clinic no factor would have supervened to affect their fertility, other than the effect of age itself. This qualification is necessary because the rate of child-bearing is not a constant quantity, but varies at different rates during reproductive life. In order to estimate the number of probable pregnancies, it is therefore necessary to make a comparison with fertility rates compiled from large numbers of individuals of different ages. If we can find a corresponding group of women who bore children at the same rate as the women studied for ten years, and we know how many children they had during the next three years, we can assume that our selected group would have had about the same number of children during that time, if they had not made a change in their reproductive habits.

Before going further into the details of the estimation a further point has to be considered. In all that has been said hitherto no assumptions have been made about the contraceptive practice of the women studied before the use of the Dutch cap. From various sources of evidence it is safe to state: (*a*) that they had not practised contraception successfully to any great extent, and (*b*) that some had practised other methods, particularly coitus interruptus, with some measure of success. There will therefore occur some cases in which the successful use of the Dutch cap is substituted for the successful use of some other method. No difference has been made to the fertility of the women in these cases, therefore they will not affect the estimate we are seeking to make of the difference made to fertility by the use of the Dutch cap. Hence, when we have arrived

at the estimate of the difference in the number of pregnancies caused by the use of the Dutch cap, the total number of pregnancies successfully prevented by that method will be greater, since it will include cases in which the successful use of the Dutch cap has been substituted for the successful use of some other method. The enquiry will therefore proceed in two stages. In the first stage we arrive at the difference brought about by the introduction of a new factor, i.e. the Dutch cap. In this stage no assumption need be made concerning the previous contraceptive practice of either the group studied or the control group who provide the fertility rates. In the second stage we take into account previous contraceptive practice. We thus arrive first at a minimum number of successfully prevented pregnancies. We then conclude that the actual number of successfully prevented pregnancies would be greater than this by an amount which we have no means of estimating accurately at present.

To determine the probable fertility of a group of women during a given period the best material available for comparison is provided by the 1911 Census Tables of Fertility. From these it is seen that fertility is affected by several variables, namely, age at marriage, duration of marriage and social group. In the tables of fertility for the whole population women are divided into groups according to age at marriage. The most obvious method of comparison would be to find in the Census tables a group of women corresponding to our selected group in average age at marriage and to see how many children were born to the Census group between the tenth and the thirteenth year of married life. The process of comparison is somewhat more complicated than this, because it is difficult to find a suitable control group in the Census tables owing to the high fertility of our selected group.

The group of women to be studied comprise 143 who attended the Birmingham Women's Welfare Centre. These consist of 115 women classed as successes in Table LIX, 13 women classed as failures, and 15 whose use of the Dutch cap was terminated by a voluntary pregnancy. Of all the individuals who used the Dutch cap these include all who can be discussed here. One success and one failure in Table LIX have to be omitted as the data required were not available. It will first be necessary to enquire how far the fertility¹ of the selected group is affected by its social distribution. The

¹ In this chapter the term "fertility" is used to denote the number of children born alive.

majority of the group belong to Census groups III and IV. In the 1911 Census the fertility rates of these groups were the same as that of the population as a whole, hence we can legitimately use the fertility rates for the whole population as a basis for comparison. The objection might be raised that the birth-rate has dropped since the 1911 Census, but as will be seen later the size of family in the selected group in 1921-28 was higher than the size of family in a similar group at the 1911 Census, so that any comparison between the fertility rates of the selected group and fertility rates in a later Census, if such were available, would be very difficult.

The number of children born alive to a group of married women is affected by the duration of marriage and by the age of the women at marriage. The selected group has been divided up into classes according to duration of marriage. In Table LXVIII the details of the projected estimation are set out. Column (1) gives the duration of marriage in each class; column (2) gives the number of women in each class; column (3) their mean age; and column (4) the mean number of children born alive. In column (5) is given the number of children born to the group of women of the same duration of marriage and age at marriage in the Census. In the first class, based on the duration of marriage, the rate selected in the Census is that for three years, this being the mean duration in the class. In all the other classes the mean coincides with the median. We now want to know what increase in family would have taken place in our selected group during the three years, following the adoption of the method if the method had not been adopted. In column (6) is given the Census fertility rate corresponding to that in column (5), but for three more years' duration of marriage.

For each class based on duration of marriage the actual fertility rate is greater than the Census rate. For the selected group as a whole the fertility is about 120 per cent. of that of a similar group in the Census. Therefore, in column (7) a fertility rate nearer to the actual one has been obtained from the Census table by keeping to the same duration of marriage and moving backwards in the table to a low age group until the nearest possible fertility rate is obtained. Column (8) is the corresponding Census rate for three more years' duration of marriage. In columns (9) and (10) are given the probable increments of family per woman in three years calculated from the Census rates (a) and (b) respectively. Columns (11) and (12) are obtained by multiplying columns (9) and (10) by the number of

TABLE LXVIII

ESTIMATION OF THE MINIMUM NUMBER OF PROBABLY PREVENTED PREGNANCIES IN A GROUP OF 143 WOMEN
USING THE DUTCH-CAP METHOD

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|------------------------------|-----------------|----------------------|-------------------------|---|-------------------------------|-----------------|-------------------------------|--------------------------|--------------------------|---------------------------------------|---------------------------------------|----------------------|---|---|
| Duration of Marriage (Years) | Number of Cases | Mean Age at Marriage | Mean Number of Children | Mean Number of Children Census Rate (a) | Census Rate (a) + Three Years | Census Rate (b) | Census Rate (b) + Three Years | Three-Year Increment (a) | Three-Year Increment (b) | Theoretical Births in Three Years (a) | Theoretical Births in Three Years (b) | Observed Pregnancies | Prevented Pregnancies (a) Minus Mis-carriages | Prevented Pregnancies (b) Minus Mis-carriages |
| 0-4 | 42 | 24 | 1.29 | 1.20 | 1.98 | 1.28 | 2.09 | 0.78 | 0.81 | 32 | 34 | 9 | 23 | 25 |
| 5-9 | 45 | 23 | 3.00 | 2.30 | 2.95 | 2.98 | 3.85 | 0.65 | 0.87 | 29 | 39 | 12 | 17 | 27 |
| 10-14 | 30 | 22 | 4.40 | 3.62 | 4.29 | 4.44 | 5.31 | 0.67 | 0.87 | 20 | 26 | 4 | 16 | 22 |
| 15-20 | 26 | 21 | 6.54 | 4.96 | 5.48 | 5.95 | 6.44 | 0.52 | 0.49 | 14 | 13 | 3 | 11 | 10 |
| | 143 | | | | | | | | | 95 | 112 | 28 | 67 | 84 |

women involved given in column (2). We thus obtain two estimates of the number of births which would be likely to occur during the three years, and by subtracting the pregnancies which actually occurred two estimates for the probable number of prevented pregnancies.

One factor of considerable importance is omitted in the table. If there is an increase in the number of children born alive to a group of women during a given interval of time a certain number of miscarriages occur. These do not appear in the Census rates which deal only with children born alive. The percentage of miscarriages and still-births is known for the selected group of women, and is about 10 per cent., so that the requisite addition can be made to the number of theoretical pregnancies given in the table. A second source of error, but in the opposite direction, might arise from an uneven distribution of fertility within the group studied, so that some women had two pregnancies in the three years. This is just possible, since the three-year period was actually a little under three years in some cases and a little over in others. The women with two pregnancies, if any, would have to be balanced by an extra number with none. This source of error is almost certainly small.

The table can most usefully be used to arrive at minimum estimates for the number of pregnancies probably prevented. Estimate (b) in the table appears to be more probable, but estimate (a) is included in order that a more cautious figure can be given as well. Taking the higher estimate, neglecting uneven fertility, but adding on probable miscarriages, we arrive at a figure of 95. Taking the lower estimate, and allowing something for uneven fertility, we arrive at a figure of 70. We may therefore conclude that in the group of 143 women considered, pregnancy was probably prevented by the use of the Dutch cap in a minimum number of cases which may be either 70 or 95.

These figures involve no assumptions concerning the contraceptive history of the selected group of women. Their high fertility rate is surprising. Whether they had previously used contraceptives is not directly known. In comparable groups of women at other clinics, the majority are said to have used no contraceptives. The rest rely for the most part on coitus interruptus rather unsuccessfully. It is clear that either the selected group of women had a natural fertility higher than that of the population as a whole, or that the general population is at present limiting the family in some way

which is not adopted by the women who visit clinics. The high fertility rate of the Birmingham women is also found in the clients of some other clinics, such as those dealt with in Himes's paper.¹

It may be interesting here to make a comparison between the fertility rates for clinic patients shown in Himes's table and those for similar groups in the 1911 Census. The rates for the groups as a whole are compared in Table LXIX. The numbers of children born alive are calculated from the data given in Himes's table.

The fertility rates for all these groups are greatly in excess of the 1911 Census rates. The objection might be raised that the selected groups contain an undue proportion of couples belonging to Groups V, VII, or VIII. The comparable Census rates for these groups are 113 per cent., 120 per cent., and 113 per cent. respectively of the rates for the general population. Thus when all possible allowances have been made for social distribution, the fertility rates of clinic patients are still seen to be remarkably high as compared with the rest of the population.

Whichever of the two figures given we adopt as a check on the reliability of the contraceptive method adopted by the group of women who attended the Birmingham Centre must be taken to be a conservative estimate. To secure an ideal control group it would be necessary to have access to fertility records of women who do not practise contraception. If such data were available it would be possible to make a more precise estimate of the number of pregnancies which would have ensued during the period of observation of the contraceptive practice. In fact, the Census figures refer to a group of women, of whom some, and possibly an appreciable proportion, actually practise birth control. The fertility of such a group will therefore be rather less than that of the ideal control group. Hence the number of pregnancies which might have ensued in the observed group had they refrained from using the cap is more likely to have been greater than to have been less than the estimate given on the basis of Census statistics. This being so, the number of pregnancies which were prevented is more likely to have been greater than to have been less than the figure deduced by this method. Thus the estimate made from this basis may be justly regarded as a conservative one. Granting the validity of the method, the facts disclosed

¹ Himes, "Birth Control—Some Racial Results", *Eug. Rev.*, 1928, Vol. XX, No. 3.

TABLE LXIX
COMPARISON OF CLINIC FERTILITY RATES WITH 1911 CENSUS RATES

| Clinic | Number of Cases | Duration of Marriage (Years) | Age at Marriage | Number of Children Born Alive | 1911 Census Rate | Excess Percentage |
|------------------|-----------------|------------------------------|-----------------|-------------------------------|------------------|-------------------|
| North Kensington | 1,000 | 8.7 | 22.6 | 3.40 | 2.51 | 135 |
| Manchester | 600 | 8.8 | 22.2 | 3.46 | 2.69 | 129 |
| Wolverhampton | 498 | 8.2 | 21.6 | 3.28 | 2.69 | 122 |
| Cambridge | 309 | 9.7 | 22.5 | 3.60 | 2.88 | 125 |
| Liverpool | 234 | 9.8 | 22.0 | 4.67 | 2.88 | 162 |
| Birmingham | 165 | 9.5 | 22.9 | 3.32 | 2.74 | 121 |
| Glasgow .. | 150 | 9.5 | 21.8 | 3.49 | 2.88 | 121 |
| Aberdeen | 109 | 10.0 | 21.1 | 5.30 | 3.33 | 159 |

TABLE LXX
ESTIMATION OF PROBABLY PREVENTED PREGNANCIES BY COMPARISON WITH MINERS' FERTILITY RATES (1911)

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|------------------------------|-----------------|----------------------|-------------------------------|---------------------|-----------------------------------|----------------------|-----------------------------------|--------------------------------|--|
| Duration of Marriage (Years) | Number of Cases | Mean Age at Marriage | Number of Children Born Alive | Miners' Census Rate | Miners' Census Rate + Three Years | Three-Year Increment | Theoretical Births in Three Years | Observed Births in Three Years | Prevented Pregnancies Minus Miscarriages |
| 0-4 | 42 | 24 | 1.29 | 1.39 | 2.34 | 0.95 | 40 | 9 | 31 |
| 5-9 | 45 | 23 | 3.00 | 2.74 | 3.60 | 0.86 | 40 | 12 | 28 |
| 10-14 | 30 | 22 | 4.40 | 4.45 | 5.36 | 0.91 | 27 | 4 | 23 |
| 15-20 | 26 | 21 | 6.54 | 6.30 | 6.96 | 0.66 | 17 | 3 | 14 |
| | 143 | | | | | | 124 | 28 | 96 |

are compatible with a higher but not with a lower proportion than the estimate given.

In the Census Group VII, which is composed of miners, we have a group which may possibly resemble our selected group more closely both as regards contraceptive practice and fertility rate. In Table LXX an estimate of theoretical pregnancies is made on the basis of the miners' fertility rates in the 1911 Census.

The 1911 miners' rates correspond very closely to the fertility rates of the selected group of women. When miscarriage and uneven fertility are taken into account, we arrive at a figure for probably prevented pregnancies of about 100. The total number of successes recorded was 116, so that it appears highly probable that pregnancy was actually prevented in all but sixteen of these cases. It is even possible to put the figure a little higher. The fertility rates given probably include a certain number of cases in which pregnancy was prevented by means of coitus interruptus. To the estimated number of prevented pregnancies should therefore be added an unknown number of cases in which the successful use of the Dutch cap was substituted for the successful use of coitus interruptus.

The analysis undertaken in the present chapter is obviously subject to many qualifications, and particularly in view of the small number of cases considered it is not claimed that any dogmatic conclusions can be drawn from it. Further work on these lines might provide a more objective criterion for estimating the reliability of contraceptive methods and checking the personal statements of those who use them. We may go so far as to say that the analysis has shown that among the women who attended the Birmingham Centre and adopted the Dutch-cap method successfully, it is highly probable that among the 116 successes conception was actually prevented in more than half. It is quite possible that conception was prevented in well over 100 of these women.

PART V

CHAPTER XV

A COMPARISON OF RESULTS WITH THOSE OF OTHER INVESTIGATORS

Any attempt to compare the results of different investigations into contraceptive statistics is attended with grave difficulties. Considerable variations exist in the accuracy with which data are collected, but of even greater importance is the fact that there is no general agreement concerning the bases on which the data should be described and summarised. Mention has already been made of the differences of opinion which exist about what constitutes a "failure". These and other differences lead to ways of arranging data yielding totally incomparable results. For example, Stopes apparently bases her percentage of failures on the number of women who return to the clinic and announce an unwanted pregnancy and the total number of women advised. Most other clinic reports make some effort to ascertain the total number of failures, but generally present the number of failures as a percentage of the total number of cases advised, thus confusing the two issues of reliability and unacceptability. Mrs. Florence, in her book *Birth Control on Trial*, goes to the opposite extreme and classes all cases as failures in which for any reason a contraceptive method proved unsatisfactory. Here again the two issues are not clearly separated. Certainly acceptability and reliability are equally important to any discussion of contraceptive technique, but for clarity of discussion, data should be presented in such a way that the two aspects of the issue can be discussed both separately and together. It must not be assumed that any bias, either conscious or unconscious, is necessarily imputed to those who compile clinic reports. Indeed, their criteria do not always make for the most favourable interpretation of their results. Many writers include as failures cases in which a method was not actually used at the time of conception. The available information in the Birmingham material analysed in a previous section was scrutinised with very great care by the present writer. It became clear that there had been included as failures in the published reports cases which should not have been regarded as such according to the criteria laid down in this enquiry. For these reasons an adequate comparison of other statistics would be impossible without a

complete reconsideration of all the facts contained therein. Hence the present chapter will deal mainly with the general conclusions reached by some other investigators.

One of the most arresting of recent investigations is that of Mrs. Florence. *Birth Control on Trial* is an account of a personal investigation into the birth-control experiences of 247 women who received advice at the Cambridge Clinic. The number of cases is small and the period covered short, but an attempt was made to obtain a detailed history of all the women advised during a given period. The social status of the women is not given in Mrs. Florence's book, but data have been given elsewhere for the women attending the Cambridge Clinic. Among the husbands, unskilled workers constitute 32 per cent., skilled 25 per cent., tradesmen 5 per cent., and professional men 5.5 per cent., the remainder being unknown. Compared with the population at large, there is a considerable excess of unskilled workers, and some excess in Groups I and II, together with a corresponding deficiency of skilled and semi-skilled workers. The significant feature of the social distribution of the Cambridge cases is the excess of unskilled workers.

On the subject of coitus interruptus, Mrs. Florence's findings are completely in accord with the results of the analysis in Part II. She found that coitus interruptus was very widely practised, was very unreliable, and often produced nervous strain and unhappiness. She also found a minority of cases in which the method appeared perfectly satisfactory. The sheath did not appear to have been used as frequently as coitus interruptus by Mrs. Florence's subjects. The figures with regard to reliability are difficult to analyse, because, as stated, failures due to giving up all or part of the advised method are included in one group. Among the total number of cases 64 per cent. had no unwanted pregnancies. This may be compared with the figure given in Part II for the percentage of women replying to the Birth Control Investigation Committee questionnaire who had no unwanted pregnancies, namely 65 per cent. The period covered by Mrs. Florence's figures is short, but on the other hand some of her unwanted pregnancies would not have been classed as failures in the analysis in Part II. Of the women who abandoned the contraceptive method advised, all but ten adopted some other method, so that the two sets of figures are fairly comparable. Mrs. Florence states that fifteen adopted no other method, but this appears to be an oversight, as it does not agree with the other figures given in the

same page of the book. In general, the percentage of those who successfully use contraception does not appear to be widely different among the women investigated by Mrs. Florence and the women who replied to the Birth Control Investigation Committee questionnaire. The conclusion may be tentatively drawn that the major part of the difficulties and failures encountered in contraceptive technique does not arise from extreme poverty or mental deficiency. The Census classification of the women studied in Part II showed that extreme poverty was a negligible factor. The ability to fill in a questionnaire can be regarded as excluding mental deficiency.

Mrs. Florence concludes from her investigation that the sheath, when advised by a clinic, is more reliable than the Dutch pessary. The present analysis does not provide many cases in which the sheath was prescribed by a clinic, so that the data do not confirm Mrs. Florence's conclusion, but on the other hand they do not contradict it, and it is in line with the estimate made of the relative reliability of these methods in Part II. It may be reasonably objected that the women who replied to the questionnaires of the Birth Control Investigation Committee did not have the same advantages of expert fitting and instruction as the women who attend clinics. This is not altogether true. In some cases attendance at clinics and fittings by doctors are mentioned. In other cases where they are not explicitly mentioned, it is reasonable to assume that women whose husbands were doctors and scientists would in some cases have availed themselves of expert advice. The conclusion reached in this paragraph, together with similar remarks in other places, represent the writer's personal opinion derived solely from a study of the data described in the present analysis. They do not agree with the opinions of other observers. They may or may not be confirmed by later work. Figures quoted by Mrs. Florence from other workers who found a history of great unreliability for the sheath among their clients are valueless, because they are based on a highly biased sample.

The great difficulty in contraceptive technique at present lies not in finding a method which will prevent pregnancies, but in finding one which will do so and at the same time be practicable and acceptable to the individual using it. This point is most clearly brought out in the Cambridge report and corroborated in the present analysis. Mrs. Florence, in common with the present writer, found that all known methods had advantages and disadvantages which differ from one individual to another. There are some individuals for

whom it is most difficult to find a practical method. In the Cambridge investigation the percentage of individuals who found a method advised unacceptable may have been thought by some critics to be excessive. It does not differ very greatly from the percentages found in Part II of the present analysis.

Other recent statistical investigations into contraceptive practice in this country have been very lucidly summarised by Dr. Blacker in a report issued under the auspices of the Birth Control Investigation Committee. In Table I of the report are collected 6,120 cases from clinics. These were all individuals who had revisited the clinics, but nothing is said about the period of time during which contraception had been practised. These figures show for success a percentage of 93·6, and for unacceptability a percentage of 8·6. As nothing is known about individuals with whom the clinics had lost touch, these percentages are not comparable with those presented in Parts II and III of the present work. They agree fairly well with the results of Nurse Daniels's questionnaires, which were collected on a not dissimilar basis. In connection with the North Kensington Clinic further details are given of a follow-up investigation of individuals who had not kept in touch with the clinic. Out of 400 cases, 40 were failures, and in 289 the method had proved unacceptable (Dutch cap). These figures are equivalent to a percentage of success of 73·5, and a percentage of unacceptability of 72. These figures are biased in the opposite direction to the previous set, since the investigation was confined to women who had omitted to revisit the clinic as requested. The result which would be found for all the cases advised by the clinic may be assumed to lie somewhere between the two sets of figures. Thus the percentage of success would lie between 73 and 95, and the percentage of unacceptability between 9 and 72. The Birmingham figures given in this analysis lie within this very wide range, being 89 per cent. and 30 per cent. respectively.

We may next consider Mrs. Ramsey's investigation. This is summarised in Dr. Blacker's report. Mrs. Ramsey investigated 500 cases from the Cambridge Clinic. Some, but not all, of Mrs. Florence's cases are included in this number. Mrs. Ramsey's figures, when analysed, show a percentage of 84 successes, and for unacceptability a percentage of 28. In the summary of the results of the two investigations compiled by the Cambridge Clinic, it appears that the percentage of successes in Mrs. Ramsey's cases

is very much greater than in those of Mrs. Florence. The percentages of successes and failures are expressed in terms of the total number of cases, and are thus greatly affected by the number of cases in which the method was abandoned. An improvement in reliability is certainly shown, and is probably due to some extent, as Dr. Blacker suggests, to the fact that the Clinic is now advising the sheath in a larger number of cases. The difference in reliability is not, however, as great as might appear from the report. A more significant difference lies in the great reduction in the percentage of unacceptability in the later figures. There is no obvious reason for the improvement, but it clearly merits further consideration. The percentages of success for the sheath and rubber pessary respectively appear to be 93 and 81. These figures probably include short-period cases, and are hence not comparable with figures which emerge from the present enquiry. They are to some extent comparable with one another, and indicate that when both methods are advocated by a clinic in considerable numbers, the sheath is somewhat more reliable than the cap. The percentage of cases in which the rubber pessary proved unacceptable was somewhat higher than that for the sheath. The Birth Control Investigation Committee questionnaire showed that the sheath was rather less acceptable than the pessary. The differences are small and probably not significant, but one or two reasons may be suggested for their occurrence. It may be that expert instruction could remove some of the difficulties that beset the use of the sheath. Alternatively the group of people who attended the Cambridge Clinic might have been more in earnest in their desire to limit their families, or the men in question might have suffered less from psychological inhibitions which would have prevented the successful use of the sheath.

Dr. Blacker's report further includes a summary of the result of a follow-up investigation of 905 cases from the Manchester, Salford, and District Clinic. The method advised was a combination of the Dutch cap, with the use of contraceptaline and syringing. The percentage of success here was 88·6. The percentage of unacceptability appears to be low. Out of the 624 cases classed as successes in the Manchester report, 63 women had used the method for a time (unspecified) and then abandoned it, while definite information was lacking in 42 cases. When these cases are deducted, the percentage of success becomes 86·6. The clinic's own estimate would be very much higher, since they only admit as failures cases in which no

reason could be found for an unwanted pregnancy. They are justified in doing so to some extent in so far as some of the failures are cases in which the complete method as advised by the clinic was not used. On the other hand, if only cases in which the complete method was used are considered, the percentage of unacceptability becomes considerably greater. With the complete triple method the percentage of success was 98·5. The Manchester results seem to agree fairly well with those of other clinics as regards reliability. The percentage of unacceptability appears to be about 17 per cent. This is considerably lower than is usually found, and may indicate that the Manchester Clinic is more than usually successful in overcoming the difficulties of its clients. One portion of the Manchester Clinic's report seems to call for comment. It reads as follows:

"The success or failure of present methods depends almost entirely on the efficiency of the woman concerned. Just as surely as we knocked on a door and saw a half-tin of Nestlé's milk on the table, together with a half-loaf, and butter or margarine in its original paper, and several layers of dirty dishes, just as surely would the patient produce her pessary from a drawer in the sideboard or a vase on the mantelpiece and explain how she had failed. So at a spotless doorstep would be found a success—a clean, painstaking woman who had taken the trouble to follow carefully the instructions given to her and had succeeded in her object."

Among the women who replied to the questionnaire of the Birth Control Investigation Committee were 83 whose husbands were University teachers, scientists or doctors. Many of these women had themselves University degrees. The present writer would be the last person to suggest that the possession of a University education necessarily implies a spotless home, but the results from the two reports may well be considered together. The percentage of these 83 women who practised contraception without a single failure was about 65 per cent.

One of the earliest clinic reports published in this country was *The First Five Thousand*. This gave an account of the work done at Dr. Stopes's first Birth Control Clinic. While undoubtedly a record of useful work accomplished, the report yields no information which can be compared with the results of the present analysis. A certain number of failures were recorded among the women who returned to the clinic. Since no follow-up work was done, neither the total number of failures nor the number of women who after being taught a method at the clinic actually practised it for any

length of time can be even surmised. No criticism of the value of the work done by the clinic is implied in the statement that the report contains no information which has any statistical value.

Reference has been made in a previous chapter to an American investigation into the sex life of women undertaken by Katherine Bemont Davis.¹ The material was collected by the questionnaire method. Detailed information with regard to contraceptive technique was lacking, but a few interesting results were obtained. The social distribution of the group is not definitely indicated. From the fact that 69 per cent. of the women had received a college or University education it may be concluded that the group corresponds to some extent in social and economic status to the group of women studied in Part II. In the American group 74.1 per cent. of the women had employed some form of contraception. The mean number of pregnancies in the group using contraceptives was 2.50, and the mean number of children born alive was 1.93. In the group using no contraceptives the numbers were 1.65 and 1.31 respectively. The significantly greater fertility of the women using contraceptives is very striking and unexpected. The maximum number of pregnancies among them was 13, while among the other women the maximum number was 7. Among the women practising birth control who had no pregnancies at all, the percentage was 13. In the remainder it was 29. The discrepancy in the number of women having no pregnancies does not account for the difference in fertility rates between the two groups. When these cases are excluded, the numbers of pregnancies in the two groups become 2.87 and 2.33 respectively. Some details are given with regard to frequency of sexual intercourse, which took place daily or more often in 90 cases. Among these women 76.4 used contraceptives. A high frequency of sexual intercourse appears to be associated with higher fertility, but the difference in the proportions using contraceptives is insignificant. Katherine Bemont Davis does not feel able to draw any conclusions, and it would be obviously rash to do so without examining the data very carefully. We are not told the duration at marriage or the age at marriage in the two groups. These two factors are known to affect the fertility rate very considerably. The most important fact seems to be not so much the difference between the two groups as the low fertility of the 255 women not using contraceptives compared with

¹ *Factors in the Sex Life of Twenty-two Hundred Women*, Katherine Bemont Davis.

such rates as those of the clinic patients discussed previously. The average age at marriage of the whole of the American group was 25·7 years. The average age of the 255 women at the time of replying to the questionnaire was 40·77 years. The mean duration of marriage must thus have been about 12 years, while the mean number of pregnancies was 1·65. Comparing the percentages who had different numbers of pregnancies, the largest number had none at all. The percentage for each number of pregnancies diminishes steadily, only 12 having more than 4 pregnancies. The number of pregnancies in this group of women is lower than that of any of the groups who replied to the Birth Control Investigation Committee questionnaire. The lowest recorded there is that of two pregnancies for the users of the sheath. Out of the 1,000 women investigated by Davis, 255 (of whom 21 had intercourse at least daily) produced apparently without any artificial means of limitation very little more than one child each over a period of 12 years.

The most determined use of contraceptive methods did not succeed in producing this result among the women studied in Part II. The existence of any comparable group in England has apparently not been revealed hitherto. It has certainly not emerged in the present investigation, but its possible existence cannot be overlooked in any discussion of the effects of contraception on the birth-rate. The unknown factors producing the low birth-rate among the American women not practising contraception may also affect the group of women who do practise it. We can therefore only record without drawing any conclusions the fact that the number of pregnancies and children born alive among the latter group is slightly higher than among those women studied in Part II, who had practised contraception successfully.

The foregoing cursory survey of a large field of enquiries serves to indicate the prevailing chaos of birth-control statistics. During the last ten years a large body of valuable information has been collected bearing upon the practice of contraception. In the absence of any general agreement regarding the presentation of the data, hardly any one set of figures can be directly compared with another. Even on the comparatively simple matter of deciding what kind of cases can be regarded as indicating the success or failure of a contraceptive method, there is no unanimity. As stated at the beginning of this chapter, a good deal of the existing confusion arises from failure to distinguish between the two separate issues of reliability and

acceptability. Another difficulty arises from the fact that it has become the practice for birth-control clinics to prescribe what is actually a combination of two or three separate contraceptive methods. When three separate methods are used, the chances of failure, as the data themselves prove, are greatly reduced. At the same time the number of women able and willing to carry it out becomes smaller with increasing elaboration of the method advised, so that, as the percentage of reliability rises, the percentage of unacceptability rises also. No method at present in use is highly satisfactory from both points of view.

When the distinction is carefully drawn between the use of the Dutch cap alone and the use of a double or triple method, all the recorded data agree fairly well with each other, and with those dealt with in the present report. They show a high percentage of reliability for the triple method. On the other hand, a number of women do not carry out the complete method, and these account for about half the total recorded failures. Where data are on record concerning the use of the sheath, they tend to confirm the conclusion arrived at in Part II. When used under similar conditions and with the same number of adjuncts, it is somewhat more reliable than the Dutch cap.

CHAPTER XVI

GENERAL CONCLUSIONS

In the present chapter an attempt will be made to answer the questions foreshadowed in the introductory chapter and to collect together the various suggestions that have emerged in the course of the analysis. To avoid a tedious repetition of qualifying remarks, it will be emphasised at the outset that all the ensuing conclusions are based on the data analysed in the previous chapters. The writer takes no responsibility for their indiscriminate application to other selected groups.

From the point of view of the individual using a contraceptive technique, the first question to be answered is which is the most reliable method. We have seen that there are in common use a number of single methods and also a number of combinations of different methods. No one single method is wholly reliable. The best are the sheath or some kind of rubber cap, the sheath being apparently slightly more reliable. Coitus interruptus is much less reliable, and quinine soluble pessaries even less so. The small number of data available with reference to syringing and the use of the sponge indicate that these methods stand still lower in the scale of reliability. In spite of the comparative unreliability of these two methods, it appears that a minority of individuals have practised coitus interruptus or have used quinine pessaries for a number of years with success, in so far as no unwanted pregnancies have occurred. Neither method can be recommended to anyone looking for a reliable contraceptive technique. The safe period as commonly understood to mean the inter-menstrual week or fortnight coincides with the period in which the likelihood that conception will occur is probably at its highest. It is therefore totally useless as a contraceptive measure. Further research may discover the existence of a true safe period which will have some value. In the existing state of knowledge the safe period is in the main a problem for research and not a practical expedient. In spite of the unreliability of the most common chemical pessaries, namely those containing quinine in cocoa-butter, it is quite possible that some of the other existing chemical pessaries may be efficient contraceptives. On this point further clinical experience is urgently needed.

Increasing knowledge of the results of using single contraceptive methods has led to the use of various combinations of methods. Of these the most common are (a) the sheath together with a soluble chemical pessary, (b) the sheath followed by syringing, either habitually or only when an accident occurs, and (c) a cervical or Dutch cap smeared with contraceptive jelly or ointment and followed by syringing. As no single method can be relied upon to prevent conception in every instance, it follows that no possible combination of known methods, however numerous, can be absolutely reliable. There is always a small chance of failure. However, a combination of more than one method very greatly diminishes the risk. With a method involving the use of the sheath, the technique of using and keeping the appliance is an important factor in reliability. Similar considerations affect the use of a rubber cap. In this case expert fitting and instruction also seem to be important. The questionnaires of the Birth Control Investigation Committee, when taken alone, do not provide conclusive evidence on this point, probably because the number of cases is small. The other two sets of data provide some evidence about the effect of having the Dutch cap fitted by an expert. If the questionnaires of Nurse Daniels must be discounted to some extent in so far as they concern reliability, the Birmingham reports are at least unbiased. It would appear probable that expert fitting and instruction may in part account for the different results obtained for the use of the Dutch-cap method. Few cases of the use of the sheath in combination with another method are on record. The present analysis indicates that the use of the sheath together with either a chemical pessary or syringing is more reliable than any other method or combination of methods commonly used. The next most reliable combination is the Dutch cap fitted by a doctor or midwife and accompanied by two other methods, such as contraceptive jelly and syringing. The data referring to the use of the cervical cap are not so extensive. When used under similar conditions, it is improbable that there would be any significant difference between the results obtained with the two types of cap.

The foregoing remarks apply to the experiences actually recorded in the questionnaires. These include insufficient data concerning the simultaneous use of a sheath and a rubber cap to justify any direct deductions from the data. Since these two methods have been shown to be the most reliable, it is a legitimate deduction from the data to state that when both these methods are employed together without

any special precautions other than those commonly adopted by persons uninstructed in birth control, the odds against a single conception occurring over a mean period of about five years are about 17 to 1. Assuming a frequency of sexual intercourse of only once per week, the odds against conception following a single intercourse are at least 5,000 when both methods are employed. These estimates are based on results obtained from a group of persons. They assume that nothing is known about the habits and constitution of any given individual. If such relevant facts were known, the probability of conception for a given individual would be either greater or less than the estimated figure.

When we turn to the acceptability of contraceptive methods, much more complicated issues arise. Individual differences have been shown to be considerable. They have been dealt with in detail. It transpires that if any one type of method is recommended to a number of people, at least a third will probably find themselves unable to use the method with satisfaction. It was commonly found that one or more methods referred to in the questionnaires of the Birth Control Investigation Committee were tried and abandoned before a satisfactory one was found. There was no unanimity concerning the type of method found satisfactory after several had been tried. Where a free choice of methods is available, it will probably be found that some form of rubber cap is rather more often acceptable than the sheath. Individual needs can best be met by making both the sheath and the rubber cap generally available. Where neither can be used satisfactorily, individuals may still fall back on chemical pessaries, syringing, or a sponge.

After consideration of personal reactions to different types of contraceptive technique, it is legitimate to suggest that increased opportunities for biological education might tend to minimise some of the difficulties incurred. Biological teaching in schools is sometimes confused with sex instruction. The latter term may merely describe a process by which the implicit taboos of children's parents are replaced by the explicit moral prohibitions of the teacher. Such teaching can do nothing to remove psychological difficulties in making adjustments to novel habits of life. On the other hand, genuine biological education, which deals in an objective and ethically neutral manner with all the facts of animal life, including reproduction, may be hoped to encourage a matter-of-fact attitude to all human functions. If such an attitude exists to contraceptive technique,

appropriate precautions need not be more embarrassing than the use of suitable cutlery and table napkins when eating dinner.

With both the sheath and any type of rubber cap, special difficulties have to be met. The very strong aesthetic objections to the use of the sheath frequently encountered may in part be due to discomfort, which could be avoided by the use of a better technique. Such technique in the use of this method has been described already. The reliability and comfort of the Dutch cap depend not only on obtaining the correct size, but also on the way in which it is inserted. Expert instruction is extremely useful to insure that the correct method of insertion is learnt. There are certain pathological conditions which appear to make the reliability of the Dutch cap uncertain. A medical man can recognize such conditions when the individual concerned is unaware of them. He can give advice accordingly. In our present state of knowledge, as already explained elsewhere, no one method can be made acceptable to all individuals. Research should therefore be prosecuted in as many different directions as possible, so that until the perfect contraceptive is discovered, a variety of existing types can be made reasonably reliable.

The ease with which a contraceptive measure can be employed is a matter of some eugenic interest. Broadly, two policies might be adopted to deal with the quality of a population. One is the policy of sterilisation. There is little likelihood that this can be enforced except where extreme types of defect bring the individual within the scope of institutional care. A second will emerge as legislative and economic machinery is brought into existence to meet the growing demand for the endowment of parenthood. The provision for such endowment could readily be regulated in such a way as to exclude from the scope of its provisions persons who fail to conform to a certain minimum of physical and social fitness. Under such a system the economic and social barriers to reproduction by unsuitable parents would be sufficient of themselves, provided there were then available contraceptive methods at the same time reliable, adapted to personal preference, and suited to the intelligence and economic resources of individuals not entitled to benefit from communal provisions for child-bearing. Unfortunately little can be said about the practicability of current contraceptive methods. They all require a modicum of intelligence and initiative in use. Probably the most moron-proof is the soluble chemical pessary. While the popular variety consisting of quinine in cocoa-butter has been shown to be

usually unreliable, there is no reason to believe that other chemical pessaries could not be considerably more effective. The principal objection to their use at present is their cost. Of the two varieties of rubber caps most commonly used, the Dutch cap seems rather easier to use than the cervical variety. Any method which involves habitual syringing is impractical where there is lack of privacy and an inadequate water supply. Stopes has pointed out that a sponge soaked in olive oil is both very simple and extremely inexpensive. This method undoubtedly has defects. It has the great merit of being available for types of women who cannot be suited by any other existing method.

The question of expense has been only lightly touched upon in previous chapters. The cost of using a sheath depends a great deal on the way in which it is used. In Chapter III some comments have been made on the best way of using and keeping a sheath. When used according to this technique, sheaths costing 9d. to 1s. 6d. can be used with complete safety for two or three months. The more common practice is either to use a cheap sheath once and then throw it away, or to buy a very expensive brand, which is often thick and therefore unpleasant to use. Thus the sheath can be very costly. The technique outlined in Chapter III accompanied by syringing in case of accident, is not only one of the most reliable methods of contraception known, but one that can be employed at a total cost of about 5s. a year, irrespective of the frequency of sexual intercourse. In Lambert's catalogue cervical and Dutch caps are listed at from 3s. to 7s. 6d. each, tubes of contraceptaline at 5s., and a syringe at from 5s. 6d. upwards. Once a syringe has been procured, the cost of syringing is negligible. Soapy water is about the most efficient spermicide known. A rubber cap lasts anything from six months to two years, or more according to the individual peculiarities of the user. Thus a rubber-cap method can be used with the appropriate adjuncts for about 10s. a year. It is more expensive than the sheath properly used need be, and the expense cannot be spread over the period of use in small instalments. For the very poor this is a serious consideration. Expense becomes a much more serious problem when chemical pessaries are used. The cheapest variety of quinine pessary costs 2s. per dozen when bought in quantity. If intercourse takes place nightly, as is not uncommon, this means an expenditure of at least 1s. 2d. per week. This rules out such a method for the very poor. Taking a lower sexual frequency, namely once per week, the annual expense would be at least 10s.

Chemical pessaries used alone can thus be as inexpensive as rubber-cap methods, but only when the sexual frequency is comparatively low. The newer and probably more efficient chemical contraceptives are still more expensive. Prices of various contraceptive appliances vary somewhat according to the source of supply. The prices quoted above are merely intended to give some idea of the relative cost of different methods.

One special problem may here be mentioned. The period in which sexual life commences in a woman is attended with more than usual difficulty and risk in the use of contraceptive methods. As an additional safeguard the physiological safe period can be usefully employed at this time. While this period is not yet sufficiently well established to be of any general use, all the evidence indicates that conception is least likely to take place in the last week of the menstrual cycle. Hence, whatever other contraceptive method is used, a virgin wishing to avoid pregnancy can diminish the likelihood of conception occurring by arranging for her first sexual experience to take place then.

From the data examined there is no evidence whatever to show that any contraceptive method has any effect on subsequent fertility. As regards most of the commonly used methods, there is no evidence either in the present study or anywhere else to show that, except in very special cases, there is any adverse effect on the health of either partner in marriage. The principal exception to the previous remark is coitus interruptus. Here there is considerable evidence to show that it may often, but not always, have deleterious effects upon nervous stability. Quinine has been shown to be followed by physical ill-effects where an individual idiosyncrasy exists. Laboratory research has cast doubts on the advisability of quinine and urea soluble pessaries, and some gynaecologists deprecate the practice of habitual syringing. Statistical evidence concerning the possible ill-effects of either of these two methods is at present lacking.

Individual needs can best be met by a free choice between the sheath and some form of rubber cap. These can be combined with one or more other methods according to the individual need for reliability and willingness to take the necessary trouble. When both of these prove unacceptable, chemical pessaries provide an agreeable and easy but sometimes expensive alternative. The present study definitely confirms the results of laboratory investigations which cast the gravest doubts on the reliability of quinine. The analysis of the questionnaires which have been studied in the previous chapters

permits no comment on chemical contraceptives of more recent origin. As a last resort we can bear in mind that of all the pure substances investigated in the laboratory, soap is one of the most efficient and least expensive. This can be used either in the form of a douche or in conjunction with a sponge. Contrary to the views of many contemporary writers on contraception, the present analysis has shown the sheath to be a method of birth control almost as acceptable as and probably more reliable than the rubber cap.

The conclusions to which an analysis of the given data has led have now been presented in a form in which they may be of practical use to the individual. The author is fully aware that data derived from personal testimony are of very restricted scientific value. Unfortunately it is difficult to get information of any other kind. In the absence of direct observation the only source of information accessible is provided by a careful scrutiny of personal testimony. If scrutinised carefully such data are at least a better guide to practice than blank ignorance. This is why the conclusions suggested by an analysis of the data contained in the text have been presented in a practical form. Sufferers from migraine or pernicious anaemia are not deterred from taking luminal or liver extract because the aetiology and pathology of these diseases are still obscure. There are many situations in which it is not always possible to wait for adequate scientific knowledge. Any expedient which seems to promise well has to be used.

In placing on record the results of this enquiry it is not the intention of the present writer to minimise the sources of error. Apart from the value of personal testimony, there are many pitfalls of interpretation even when direct observation is available. Contraception is one factor limiting a very complex process which results in the production of children. There are other factors which also limit the number of children born to individual parents. A satisfactory estimate of the rôle of contraceptive technique must always take these factors into consideration. The nature of these factors is frequently obscured by the loose way in which such terms as fecundity and fertility are commonly used. For that reason the former has not been used in these pages, and the latter is only employed in a purely descriptive sense. Fertility as defined by statisticians, and as used in this discussion signifies the total number of living children born to a woman or group of women during the entire period of child-bearing, that is to say the period between fifteen and forty-

five years of age. Such a definition has the merit of concentrating attention on that aspect of human reproduction which can be observed with least error. In countries which have well-established systems of birth registration the number of live births which escape being recorded is certainly very small. In some cases it is difficult to determine whether a child is alive at the moment of birth or not. When data are collected by the questionnaire method there may occur slips of the pen or deliberate misstatements. Such sources of error are sufficiently small to be neglected for most purposes.

Of the factors involved in the production of living children, the first requirement is the formation of functional gametes in both sexes. The male gamete must then be deposited in the body of the female at a time when it can meet with a fertilisable ovum, and no mechanical barrier or toxic agent must be present to prevent the sperm fertilising the ovum. This involves two issues. One is the frequency with which male gametes are deposited in the body of the female, the other is the accessibility of the ovum to them. Finally, the fertilised ovum must survive through the nine months of pregnancy. Each of these factors is subject to individual variation arising partly from the genetic constitution of the individual and partly from the fact that sexual behaviour is highly conditioned by external agencies. All such individual differences contribute to observed differences in fertility. Human beings profit by experience. Individuals who are more fertile are most likely to have discarded less efficient contraceptive methods in favour of more reliable ones. It is therefore gratuitous to assume that differences in fertility will be equally distributed among groups of individuals practising different contraceptive methods. Sterile individuals of both sexes are known to occur. The term sterility as applied to males implies that the first requirement is not realised, that is to say, that functional gametes or spermatozoa are not produced. In females sterility is used to imply at least three possible contingencies. One is that the secretions of the generative tract are unfavourable to the activity of the sperm. One is that ovulation fails to occur regularly. A third is the early resorption of the embryo, i.e. a failure to meet the third requirement in the production of living children. For any of these three reasons, or because the male partner was sterile, any estimate of the success of a contraceptive method must take into account the probability that some of the women studied would not have become recognisably pregnant in any case.

Generally speaking, contraceptive technique involves interference with the second requirement enumerated above. The sperm is prevented from fertilising the ovum after coitus has taken place. Recent physiological research does not permit us to neglect the frequency of coitus as a factor materially affecting the probability of conception. This consideration is almost universally neglected by writers on contraception. In addition to this, anatomical displacements of the internal organs of the female may facilitate or otherwise the entrance of the seminal fluid into the uterus. Finally, postural differences in executing the sexual act and the relative size of the sexual organs of the two partners involve differences in the degree of penetration effected and the likelihood that ejaculation will or will not occur in close propinquity to the cervical orifice. What has been said of sterility applies with equal cogency to all these contingencies. We are not entitled to assume that differences in the frequency of sexual intercourse, the posture assumed during the sexual act, and the anatomical configuration of the female genital tract will be equally distributed in groups of women practising different methods of contraception.

The third requirement of the process involved in producing living children is partly controlled in so far as the criterion of pregnancy rather than birth has been used in this enquiry. This does not eliminate all sources of error. The high foetal mortality known to exist in the later stages of pregnancy is some presumption in favour of the view that there is considerable mortality in the earlier stages. This presumption is abundantly supported by experimental evidence, which shows that very early resorption of the embryo can be produced by dietetic differences in animals. Early resorption of embryos due to lethal genes is also known to occur in mammals. Very early resorption of the embryo would frequently be dismissed as an irregularity of menstruation and would not be classified as a pregnancy in these data. Differences in fertility of this kind arising from genetic constitution or environment may be associated with the use of a particular contraceptive technique for the reason already given.

Since all that can be accurately observed at present as a result of contraceptive technique is the end-product of a complicated biological process, more knowledge of the individual factors involved is evidently essential to a complete study of contraception. Every known feature of the reproductive process is subject to individual variability. In many animals differences in fertility have been shown

to be genetically determined. In animals capable of forming conditioned reflexes the sexual impulse can be conditioned. This has even been shown to be true of the rat. Much more so is it true of primates, as Dr. Zuckerman has shown. In baboons the sex act, so far from being a simple reflex, cannot be satisfactorily carried out unless an educational period has been passed through at the right age. Such conditioning of the sex impulse with its great capacity for variability in behaviour might seem too obvious to need statement. It is frequently overlooked. The divorce laws of this country are still founded on the assumption that sex is a simple reflex. Since sexual behaviour is a conditioned pattern, differences in the freedom from supervision which children enjoy may well contribute to the differences in fertility which are found in different social classes.

This brings us to a consideration of the attitude of different individuals to the use of a contraceptive method. The use of contraception implies an individual response to certain stimuli. The questionnaires studied have only touched incidentally upon the stimulus to contraception. It is generally agreed that the principal stimuli or causes are economic. In other words, people tend nowadays to have no more children than they can afford. What people can afford is generally interpreted in terms of a standard of life relative to their social upbringing or social aspirations. It is less clearly recognised that the number of children which a group of people can afford to have is also relative to their inclination to undertake parenthood. There is little general agreement about the correct number of children for a given size of income. While the birth-rate has fallen, standards of life for all classes have risen. The decrease in fertility has been most marked in the more well-to-do classes. When the economic stimuli exist and contraceptive knowledge is available, any failure on the part of the individual to respond by limiting the family to a size regarded as suitable by some other person is often dismissed as lack of intelligence. The person who passes this judgment is usually a member of the professional class. In the society in which we live, as Fisher has pointed out, individuals are partly selected for promotion from one social class to another on account of their comparative infertility. We have seen that there exist great individual variations in the biological factors affecting fertility. We may refer to this complex of factors, of which little is known except its great individual variability, as reproductive intensity. Clearly the response to any given set

of economic stimuli will be different according as the reproductive intensity of the individual varies. Observers drawn from a professional class in which success is partly dependent on sterility will tend to undervalue the importance of individual variations in reproductive intensity. It may be that a woman who produces a large family in conditions which appear to a richer person as squalor is not very different from the artist or poet working out creative impulses in a garret. She may not necessarily be of inferior intelligence to her neighbour who prefers the aspidistras and lace curtains of respectability. It is not proved that everything embodied in what is commonly regarded as a high standard of life for children is necessary to produce the best kind of people. Some of it, such as certain of the more expensive kinds of education, may be definitely harmful. Disease and lack of vigour are not unknown in the spotless and safeguarded nurseries of the well-to-do.

From the point of view of the community the spread of contraceptive knowledge raises two major problems. The first is the differential fertility between social groups. The second is raised by the rapid decrease in the birth-rate in Western Europe. Many writers have pointed out that differential fertility is tending to disappear. By this they mean that in Germany and Sweden the poorer classes, regarded by them as less desirable parents, are now having fewer children than the rich. Nevertheless, there will still remain a class of subnormal individuals who can in no sense be regarded as desirable parents. It is unnecessary here to discuss whether feeble-mindedness is mainly determined by heredity or environment. Advocates of both views might agree on the proposition that a feeble-minded woman is not fit to have the care of children, either her own or those of anyone else. Hence as long as the institution of the family persists it is urgent that research into the simplest forms of contraceptive technique should be prosecuted.

Contraception is generally regarded as one of the principal factors affecting the rapidly falling birth-rate in Western Europe. It is sometimes thought to be the sole factor of importance. The rapid decline in the birth-rate in this country is well known. It is not so widely realised that most of the rest of Europe, Catholic as well as Protestant, is coming into line, and is likely to be faced at some not very remote date with a diminishing population. It would be interesting to know what contraceptive knowledge is being disseminated in Bulgaria, where the decline in fertility since 1900 has been par-

ticularly steep.¹ Our knowledge of what is happening in this country is scanty, and the information elicited from the questionnaires studied in the preceding chapters throws little light on the spread of contraceptive knowledge.

The rapid spread of contraceptive information in this country is usually dated from the Bradlaugh trial in 1877. About this date the birth-rate began to fall. The temporal conjunction of these two events has been used as an argument in favour of the view that the spread of contraceptive knowledge has had an important effect on the birth-rate. For the group studied in Part II, the present study has shown that the two most widely used methods are coitus interruptus and the sheath. Coitus interruptus has a history which goes back to Biblical times. The sheath was advertised in this country in 1783. The pioneers of birth control who figured in the celebrated Bradlaugh trial advocated these two methods, and in addition to them the use of the sponge. The results of this enquiry suggest that the last-named method is not widely used. The methods of family limitation which are used most widely to-day by the female population, excluding the use of purgatives for abortion, are the rubber cap and chemical pessaries. These were not advocated by birth-control propagandists until some years after the decline of the birth-rate began in this country. Thus the data derived from these questionnaires do not throw any light on the factors which influenced the decline of the British birth-rate in its initial stages, when such knowledge of family limitation as then existed depended mainly on a stream of oral traditions disseminated through the male population.

While providing no information concerning this period, one positive conclusion does emerge from the study of the clinic population included in this enquiry. The data reveal the existence of a group of women with a high fertility before attending the clinic and a very greatly diminished fertility after availing themselves of facilities for birth control introduced during the last decade. It may be presumed on the evidence that such facilities provide a more efficient means of family limitation than they had at their disposal previously. Stevenson's analysis of the 1911 Census shows that the decline of the birth-rate began in the more prosperous classes. The clinic population of this enquiry represents a social group which did not contribute conspicuously to the initial phase of the decline of the birth-rate. To the extent that this group is now involved in the general decline, the

¹ Kuczynski, *The Balance of Births and Deaths*.

present enquiry supports the view that contraception is one of the major factors influencing population growth during the past decade. This does not necessarily imply that contraceptive practice is now—still less has been till recently—the sole effective agency contributing to a diminishing birth-rate. This enquiry has contributed no information about the spread of contraceptive practice in those social classes which do not avail themselves of clinic facilities. If the answers to the questionnaires issued by the Birth Control Investigation Committee are a representative sample, the practice encouraged by birth-control clinics only affects a small fraction of those people whose fertility is much lower than was prevalent in Victorian times.

Assuming that the factors at present operating to produce a falling birth-rate continue to operate in the same way, Bowley's estimates and those of Kuczynski suggest that statesmen in the near future will be compelled to face two alternatives. One is a gradual process of national extinction. The other is the adoption of a policy directed to arrest the decline of the reproductive rate. If they decide upon the latter course, contraception will pass from the realm of private manipulation into that of social control. As with every advance in the possibilities of regulating human life, control of reproduction has met with violent opposition. Perhaps when the first steps were taken to control hunger by the cultivation of crops, Neolithic elders pointed out the evils and dangers attendant on such an innovation. If our Neolithic moralist could have foreseen the world of to-day, he might have felt that there was some justification for his fears. Nevertheless, there are few people alive now who would really wish to abandon all the pleasant and interesting complexities of modern life for a return to the existence of primitive hunting peoples. Control of reproduction in some form is probably as old as or older than agriculture. Modern developments have largely consisted in finding substitutes for expedients such as abortion and infanticide now repugnant to humane sentiment. The greater harmlessness and efficacy of modern substitutes seem to be leading up to a situation when some form of collective control of reproduction will be necessary.

More than one conceivable line of future development can be envisaged. The population situation is likely to become acute long before biology has provided any clue to the necessary technique for laboratory reproduction. To the present writer it seems that, whatever other changes in economic structure take place, a considerable transference of financial responsibility from fathers of families to the

community will then become inevitable. It seems likely that much current abstention from reproduction is due to the disinclination of men to undertake increased economic responsibilities which bring with them few compensations such as maternity brings to women. Under a system of family endowment women willing to undertake the production of children may find themselves in a position of increased power and privilege. The collectivisation of reproduction may provide conditions in which the creative maternal impulse will find more satisfactory expression than is possible to-day. Motherhood will be dignified rather than degraded when sentiment and ignorance are replaced by scientific understanding and organisation.

APPENDIX

TABLE XII
No CONTRACEPTIVE METHOD USED

| | | Number of pregnancies | | | | | | | | |
|---------------------------------------|----|-----------------------|---|---|---|---|---|---|----|--------|
| | | I | 2 | 3 | 4 | 5 | 7 | 9 | 11 | Totals |
| Duration of reproductive life (years) | 2 | | I | | | | | | | I |
| | 5 | | | I | | | | | | I |
| | 6 | | | | I | | | | | I |
| | 9 | | I | | | I | | | | 2 |
| | 12 | I | | | | | | | | I |
| | 15 | | I | | | | | | | I |
| | 17 | | | | | | I | | I | 2 |
| | 19 | | | | | I | | I | | 2 |
| 22 | | | I | | | | | | I | |
| Totals .. | | I | 3 | 2 | I | 2 | I | I | I | 12 |

$$r = 0.467. \quad \sigma_r = 0.223.$$

TABLE XIII
No CONTRACEPTIVE METHOD USED

| | | Number of children born alive | | | | | | | | |
|---------------------------------------|----|-------------------------------|---|---|---|---|---|---|----|--------|
| | | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 10 | Totals |
| Duration of reproductive life (years) | 2 | | 1 | | | | | | | 1 |
| | 5 | | 1 | | | | | | | 1 |
| | 6 | 1 | | | | | | | | 1 |
| | 9 | | 1 | | 1 | | | | | 2 |
| | 12 | 1 | | | | | | | | 1 |
| | 15 | | 1 | | | | | | | 1 |
| | 17 | | | | | | 1 | | | 2 |
| | 19 | | | | | 1 | | 1 | | 2 |
| 22 | | | 1 | | | | | | 1 | |
| Totals .. | | 2 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 12 |

$$r = 0.641. \quad \sigma_r = 0.170.$$

TABLE XIV
SHEATH METHOD USED ONLY

| | | Number of pregnancies | | | | | | |
|--|----|-----------------------|---|----|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | Totals |
| Duration of reproductive life (years) | 1 | 1 | | | | | | 1 |
| | 3 | | 1 | 2 | | | | 3 |
| | 5 | | 1 | 1 | | | | 2 |
| | 7 | | | 1 | | 1 | | 4 |
| | 8 | | 1 | | 1 | | 2 | 2 |
| | 10 | | | 4 | | | | 4 |
| | 11 | | | 1 | | | | 1 |
| | 12 | | 1 | 1 | 1 | | | 3 |
| | 13 | | 1 | 2 | 1 | | | 4 |
| | 14 | | 1 | | | | | 1 |
| | 17 | | | | 2 | | | 2 |
| | 18 | | 2 | | 1 | | | 3 |
| Totals .. | | 1 | 8 | 12 | 6 | 1 | 2 | 30 |

$$r = 0.045. \quad \sigma_r = 0.182.$$

TABLE XV
SHEATH METHOD USED ONLY

| | | Number of children born alive | | | | |
|---------------------------------------|----|-------------------------------|----|----|---|--------|
| | | 0 | 1 | 2 | 3 | Totals |
| Duration of reproductive life (years) | 1 | 1 | | | | 1 |
| | 3 | | 1 | 2 | | 3 |
| | 5 | | 1 | 1 | | 2 |
| | 7 | | 1 | 1 | 2 | 4 |
| | 8 | | 1 | 1 | | 2 |
| | 10 | | | 4 | | 4 |
| | 11 | | | 1 | | 1 |
| | 12 | | 2 | | 1 | 3 |
| | 13 | | 1 | 2 | 1 | 4 |
| | 14 | | 1 | | | 1 |
| | 17 | | | 1 | 1 | 2 |
| | 18 | | 2 | 1 | | 3 |
| Totals .. | | 1 | 10 | 14 | 5 | 30 |

$$r = 0.044. \quad \sigma_r = 0.182.$$

TABLE XVI
COITUS INTERRUPTUS USED ONLY

| | | Number of pregnancies | | | | | | | | | | | Totals | |
|---------------------------------------|----|-----------------------|---|----|---|---|---|---|---|---|---|----|--------|----|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | 11 |
| Duration of reproductive life (years) | 5 | 1 | | 1 | | | | | | | | | | 2 |
| | 6 | | 1 | | | | | | | | | | | 1 |
| | 8 | | | 1 | | | | | | | | | | 1 |
| | 10 | | | 1 | 1 | | | | | | | | | 2 |
| | 11 | 1 | | 1 | 1 | | | | | | | | | 3 |
| | 12 | | | 2 | | | 1 | | | | | | | 3 |
| | 13 | | 2 | | | | | | | | | | | 2 |
| | 14 | 1 | | | | | | | | | | | | 1 |
| | 15 | | | 1 | | | | 1 | | | | | | 2 |
| | 16 | | 1 | 2 | | | 1 | | | | | | | 4 |
| | 17 | | 1 | 1 | 2 | | 1 | | | | | | | 5 |
| | 18 | | | | | | | | | | | | 1 | 1 |
| | 19 | | | | | 1 | | | | | | | | 1 |
| 20 | | | | | 1 | | 1 | | | | | | 2 | |
| 21 | | | 3 | | | | | | | | | | 3 | |
| 22 | | 1 | 1 | | | | 1 | | | | | | 3 | |
| Totals .. | | 3 | 6 | 14 | 4 | 2 | 3 | 3 | | | | | 1 | 36 |

$$r = 0.331.$$

$$\sigma_r = 0.148.$$

TABLE XVII

COITUS INTERRUPTUS USED ONLY

| | | Number of children born alive | | | | | | | | | | | | Totals |
|---------------------------------------|----|-------------------------------|---|----|---|---|---|---|---|---|---|----|----|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | |
| Duration of reproductive life (years) | 5 | 1 | | | 1 | | | | | | | | | 2 |
| | 6 | | 1 | | | | | | | | | | | 1 |
| | 8 | | 1 | | | | | | | | | | | 1 |
| | 10 | | | 1 | 1 | | | | | | | | | 2 |
| | 11 | 1 | | 1 | 1 | | | | | | | | | 3 |
| | 12 | | | 2 | | | 1 | | | | | | | 3 |
| | 13 | | 2 | | | | | | | | | | | 2 |
| | 14 | 1 | | | | | | | | | | | | 1 |
| | 15 | | | 1 | | | 1 | | | | | | | 2 |
| | 16 | | 2 | 1 | | | 1 | | | | | | | 4 |
| | 17 | | 1 | 2 | 1 | | 1 | | | | | | | 3 |
| | 18 | | | | | | | | | | | | 1 | 1 |
| | 19 | | | | 1 | | | | | | | | | 1 |
| | 20 | | | | | 1 | | 1 | | | | | | 2 |
| 21 | | 1 | 2 | | | | | | | | | | 3 | |
| 22 | | 1 | 1 | | | 1 | | | | | | | 3 | |
| Totals .. | | 3 | 9 | 11 | 5 | 1 | 5 | 1 | | | | | 1 | 36 |

$$r = 0.272.$$

$$\sigma_r = 0.158.$$

TABLE XVIII
RUBBER CAP METHOD USED ONLY

| | | Number of pregnancies | | | | | | | |
|---------------------------------------|----|-----------------------|---|---|---|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | Totals |
| Duration of reproductive life (years) | 1 | 2 | 1 | | | | | | 1 |
| | 2 | | | | | | | | 2 |
| | 3 | | 1 | 1 | | | | | 2 |
| | 4 | | 1 | | 1 | | | | 2 |
| | 5 | | 1 | | | | | | 1 |
| | 6 | | 2 | | | | | | 2 |
| | 7 | | 1 | | 2 | | | | 3 |
| | 9 | | 1 | | | | | | 1 |
| | 10 | | | 1 | | | | | 1 |
| | 11 | | | | | 1 | | | 1 |
| | 14 | | | | | | | 1 | 1 |
| | 15 | | | | | | | | 1 |
| | 19 | | | | | 1 | | | 1 |
| Totals .. | | 2 | 8 | 2 | 5 | | 1 | 1 | 19 |

$$r = 0.719.$$

$$\sigma_r = 0.111.$$

TABLE XIX
RUBBER CAP METHOD USED ONLY

| | | Number of children born alive | | | | | | |
|---------------------------------------|----|-------------------------------|---|---|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | Totals |
| Duration of reproductive life (years) | 1 | | 1 | | | | | 1 |
| | 2 | 2 | | | | | | 2 |
| | 3 | | 2 | | | | | 2 |
| | 4 | | 1 | 1 | | | | 2 |
| | 5 | | 1 | | | | | 1 |
| | 6 | | 2 | | | | | 2 |
| | 7 | | 1 | 1 | 1 | | | 3 |
| | 9 | | 1 | | | | | 1 |
| | 10 | | | 1 | | | | 1 |
| | 11 | | | | 1 | | | 1 |
| | 14 | | | | | | 1 | 1 |
| | 15 | | | | | | 1 | 1 |
| | 19 | | | | 1 | | | 1 |
| Totals | .. | 2 | 9 | 3 | 3 | 0 | 2 | 19 |

$$r = 0.805.$$

$$\sigma_r = 0.081.$$

TABLE XX
QUININE USED ONLY

| | | Number of pregnancies | | | | | | | | |
|--|----|-----------------------|---|---|---|---|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totals |
| Duration of reproductive life (years) | 4 | | | 1 | | | | | | 1 |
| | 5 | | | 1 | | | | | | 1 |
| | 7 | 2 | | | | | | | | 2 |
| | 8 | | | | 1 | 1 | | | | 2 |
| | 9 | 1 | | | | | | | | 1 |
| | 10 | | | 1 | | | | | | 1 |
| | 11 | | | | 2 | | | | | 2 |
| | 12 | | 1 | 1 | 1 | | 1 | | | 4 |
| | 14 | | | | | | 1 | | | 1 |
| | 16 | | | | 1 | | | | | 1 |
| | 17 | | | | 1 | | | | 1 | 2 |
| | 18 | | | | | | | 1 | | 1 |
| Totals .. | | 3 | 1 | 4 | 6 | 1 | 2 | 1 | 1 | 19 |

$$r = 0.620.$$

$$\sigma_r = 0.141.$$

TABLE XXI
QUININE USED ONLY

| | | Number of children born alive | | | | | |
|---------------------------------------|----|-------------------------------|---|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | Totals |
| Duration of reproductive life (years) | 4 | | | 1 | | | 1 |
| | 5 | | 1 | | | | 1 |
| | 7 | 2 | | | | | 2 |
| | 8 | | | | | 2 | 2 |
| | 9 | 1 | | | | | 1 |
| | 10 | | | 1 | | | 1 |
| | 11 | | | | 2 | | 2 |
| | 12 | | 3 | 1 | | | 4 |
| | 14 | | | | 1 | | 1 |
| | 16 | | 1 | | | | 1 |
| | 17 | | | | 1 | 1 | 2 |
| | 18 | | | | 1 | | 1 |
| Totals .. | | 3 | 5 | 3 | 5 | 3 | 19 |

$$r = 0.316.$$

$$\sigma_r = 0.206.$$

TABLE XXII

UNSUCCESSFUL CONTRACEPTION

| | | Number of pregnancies | | | | | | | | | | | | Totals |
|---------------------------------------|----|-----------------------|----|----|----|----|---|---|---|---|----|----|----|--------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Duration of reproductive life (years) | 1 | 3 | | | | | | | | | | | | 3 |
| | 2 | 1 | | | | | | | | | | | | 1 |
| | 3 | 3 | 3 | | | | | | | | | | | 6 |
| | 4 | | 4 | 1 | | | | | | | | | | 5 |
| | 5 | 1 | 3 | 1 | 1 | | | | | | | | | 6 |
| | 6 | | 1 | 1 | | | | | | | | | | 2 |
| | 7 | | 5 | 2 | 2 | | | | | | | | | 9 |
| | 8 | 2 | 3 | 3 | 1 | | | 1 | | | | | | 10 |
| | 9 | 1 | 3 | 4 | 0 | 1 | | | | | | | | 9 |
| | 10 | | | 1 | 3 | | | | | | | | | 4 |
| | 11 | | 2 | 4 | 3 | | | | | | | | | 9 |
| | 12 | | 3 | 3 | 2 | | 2 | | | | | | | 10 |
| | 13 | | | 3 | 1 | 1 | | | | | | | | 5 |
| | 14 | 1 | | 4 | 3 | 1 | 1 | | | | | | | 10 |
| | 15 | | 2 | 2 | 2 | | 1 | | | | | | | 7 |
| | 16 | | 3 | 1 | 2 | 2 | | | | 1 | | | | 9 |
| | 17 | | 1 | 4 | 1 | 1 | 1 | | | 1 | | | | 9 |
| | 18 | | 1 | 1 | 1 | 2 | 1 | | | 1 | | 1 | 1 | 9 |
| | 19 | | 3 | 2 | 3 | | 1 | 1 | | | | | | 10 |
| | 20 | | | 1 | 2 | 1 | | 2 | 1 | 1 | | | | 8 |
| | 21 | | 1 | | 1 | 1 | | | | | | | | 3 |
| | 22 | | | | | | 2 | | | | | | | 2 |
| | 23 | | | | | 1 | | | | | | | | 1 |
| | 24 | | | | | | | | | | | 1 | | 1 |
| | 25 | | | | | | | 1 | | | | | | 1 |
| Totals .. | | 12 | 38 | 38 | 28 | 11 | 9 | 5 | 1 | 4 | 0 | 2 | 1 | 149 |

0.564.

 $\sigma_r = 0.056,$

TABLE XXIII

UNSUCCESSFUL CONTRACEPTION

| | | Number of children born alive | | | | | | | | | | | Totals | |
|---------------------------------------|----|-------------------------------|----|----|----|----|----|---|---|---|---|----|--------|-----|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | 11 |
| Duration of reproductive life (years) | 1 | 2 | 1 | | | | | | | | | | | 3 |
| | 2 | | 1 | | | | | | | | | | | 1 |
| | 3 | | 4 | 2 | | | | | | | | | | 6 |
| | 4 | | | 5 | | | | | | | | | | 5 |
| | 5 | | 1 | 4 | 1 | | | | | | | | | 6 |
| | 6 | | | 2 | | | | | | | | | | 2 |
| | 7 | | | 7 | 1 | 1 | | | | | | | | 9 |
| | 8 | | 5 | 2 | 2 | 1 | | | | | | | | 10 |
| | 9 | | 1 | 5 | 3 | | | | | | | | | 9 |
| | 10 | | | | 1 | 3 | | | | | | | | 4 |
| | 11 | | 1 | 2 | 3 | 3 | | | | | | | | 9 |
| | 12 | 1 | 3 | | 4 | 1 | | 1 | | | | | | 10 |
| | 13 | | | | 3 | 1 | 1 | | | | | | | 5 |
| | 14 | 1 | | 2 | 7 | | | | | | | | | 10 |
| | 15 | | 2 | 2 | 1 | 1 | 1 | | | | | | | 7 |
| | 16 | | 1 | 3 | 1 | 2 | 2 | | | | | | | 9 |
| | 17 | | 1 | 1 | 3 | 1 | 2 | | 1 | | | | | 9 |
| | 18 | | 1 | 1 | 2 | 1 | 1 | 1 | 1 | | | | 1 | 9 |
| | 19 | | 1 | 3 | 3 | 1 | 2 | | | | | | | 10 |
| | 20 | | 1 | 1 | | 2 | 2 | | | 1 | 1 | | | 8 |
| | 21 | | | 1 | 1 | 1 | | | | | | | | 3 |
| | 22 | | | | | | 2 | | | | | | | 2 |
| | 23 | | | | | | 1 | | | | | | | 1 |
| | 24 | | | | | | | 1 | | | | | | 1 |
| | 25 | | | 1 | | | | | | | | | | 1 |
| Totals .. | | 4 | 24 | 44 | 36 | 19 | 14 | 3 | 2 | 1 | 1 | 0 | 1 | 149 |

TABLE XXIV

SUCCESSFUL CONTRACEPTION

| | | Number of pregnancies | | | | | | | | | | |
|---------------------------------------|----|-----------------------|----|----|----|----|----|---|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Totals |
| Duration of reproductive life (years) | 1 | 3 | 1 | | | | | | | | | 4 |
| | 2 | 10 | 1 | 1 | | | | | | | | 12 |
| | 3 | 3 | 6 | 3 | 1 | | | | | | | 13 |
| | 4 | 6 | 3 | 3 | | | | | | | | 12 |
| | 5 | 3 | 9 | 5 | 2 | | | | | | | 19 |
| | 6 | | 9 | 1 | 1 | | | | | | | 11 |
| | 7 | 2 | 2 | 8 | 5 | 1 | 2 | | | | | 20 |
| | 8 | 1 | 1 | 4 | 4 | 1 | | | | | | 11 |
| | 9 | 2 | 2 | 4 | | | | | | | | 8 |
| | 10 | 2 | | 11 | 6 | | | 1 | | | | 20 |
| | 11 | 1 | | 7 | 6 | | 1 | | 1 | | | 16 |
| | 12 | 1 | 3 | 13 | 2 | 2 | 2 | 1 | | | 1 | 25 |
| | 13 | | 3 | 6 | 2 | 1 | | | | | | 12 |
| | 14 | 1 | 1 | | 3 | | 2 | | 1 | | | 8 |
| | 15 | | 2 | 3 | 4 | | | 1 | | | | 10 |
| | 16 | | 3 | 3 | 5 | 1 | 4 | | | | | 16 |
| | 17 | | 4 | 3 | 6 | 3 | | | 1 | | | 17 |
| | 18 | 1 | 1 | 3 | 1 | 1 | | 2 | | | | 9 |
| | 19 | | | 1 | 3 | 3 | 1 | 1 | 1 | | | 10 |
| | 20 | | 1 | 1 | 1 | 1 | | 1 | | | 1 | 6 |
| | 21 | | 1 | 4 | | 1 | 1 | | | | | 7 |
| | 22 | | 1 | 1 | 1 | | 1 | | | | | 4 |
| | 23 | | | | | | | | | | | 0 |
| | 24 | | | | | | | | 1 | | | 1 |
| Totals .. | | 36 | 54 | 85 | 53 | 15 | 14 | 7 | 5 | 0 | 2 | 271 |

$$r = 0.499.$$

$$\sigma_r = 0.046.$$

TABLE XXV

SUCCESSFUL CONTRACEPTION

| | | Number of children born alive | | | | | | | | | |
|---------------------------------------|----|-------------------------------|----|----|----|----|----|---|---|---|--------|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Totals |
| Duration of reproductive life (years) | 1 | 3 | 1 | | | | | | | | 4 |
| | 2 | 10 | 1 | 1 | | | | | | | 12 |
| | 3 | 4 | 5 | 2 | 2 | | | | | | 13 |
| | 4 | 6 | 5 | 1 | | | | | | | 12 |
| | 5 | 3 | 11 | 4 | 1 | | | | | | 19 |
| | 6 | | 9 | 1 | 1 | | | | | | 11 |
| | 7 | 3 | 4 | 9 | 4 | | | | | | 20 |
| | 8 | 1 | 2 | 5 | 1 | 2 | | | | | 11 |
| | 9 | 2 | 3 | 3 | | | | | | | 8 |
| | 10 | 2 | 1 | 13 | 4 | | | | | | 20 |
| | 11 | 1 | | 8 | 5 | | 2 | | | | 16 |
| | 12 | 2 | 4 | 12 | 3 | 2 | 2 | | | | 25 |
| | 13 | | 3 | 7 | 1 | 1 | | | | | 12 |
| | 14 | 1 | 1 | 2 | 3 | | 1 | | | | 8 |
| | 15 | | 1 | 6 | 2 | | 1 | | | | 10 |
| | 16 | | 4 | 5 | 2 | 3 | 2 | | | | 16 |
| | 17 | | 6 | 4 | 5 | 2 | | | | | 17 |
| | 18 | 2 | 3 | 2 | | | 1 | 1 | | | 9 |
| | 19 | | | 1 | 7 | | 1 | 1 | | | 10 |
| | 20 | | 1 | 1 | 1 | 1 | | 1 | | 1 | 6 |
| | 21 | | 2 | 3 | | 1 | 1 | | | | 7 |
| | 22 | | 1 | 2 | | | | 1 | | | 4 |
| | 23 | | | | | | | | | | 0 |
| | 24 | | | | | | | | 1 | | 1 |
| Totals .. | | 40 | 68 | 92 | 42 | 12 | 11 | 4 | 1 | 1 | 271 |

$$r = 0.506.$$

$$\sigma_r = 0.045.$$

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